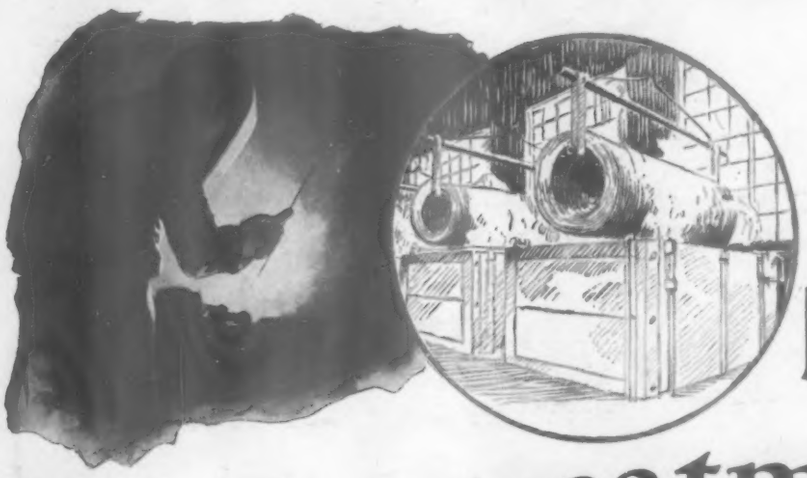
The Welding Engineer

Reg. U. S. Pat. Office

Founded by L. B. Mackenzie, 1916

AUGUST, 1927 VOL. 12, No. 8

$3.00 per year in U. S. 608 S. Dearborn St., Chicago, Ill. $4.00 per year abroad



TYPE A
for use on cast iron.
TYPE B
for use with automatic welding machines.
TYPE F
for general welding of steel.

It's the treatment that counts

In absolute reliability of operation and over-all efficiency, G-E Arc Welders are unequalled. They are available in all sizes, all types—for either hand or automatic operation—for one or more operators.

Ordinary welding wire sputters and dissipates because of segregated moisture and hydrogen which explodes under the heat of the arc.

In the Type "F", G-E Welding Electrode moisture and hydrogen are reduced to an absolute minimum.

Substances are introduced which help to produce a smoother, free flowing arc.

Type "F" can save money for you. This special General Electric method of treatment helps to produce stronger welds—makes the electrode easier for an operator to handle—helps him to do more work. And Type "F" is not any more expensive than ordinary bare wire.

One of our special G-E Welding Electrode Distributors will be glad to tell you more about it.

For automatic welding Type B, G-E Welding Electrode is best. The concentrated arc, confined by encasing the flux around the core in a sheath, gives remarkable penetration and *higher speed* welding.

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A. J. Wilson Co., Inc.,
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New York, N. Y.

550-18H

GENERAL ELECTRIC

MERCHANDISE DEPARTMENT, BRIDGEPORT, CONNECTICUT

Published monthly by the Welding Engineer Publishing Co. Entered as second class matter Jan. 20, 1916, at the Post Office at Chicago, Ill. Under the Act of March 3, 1897.

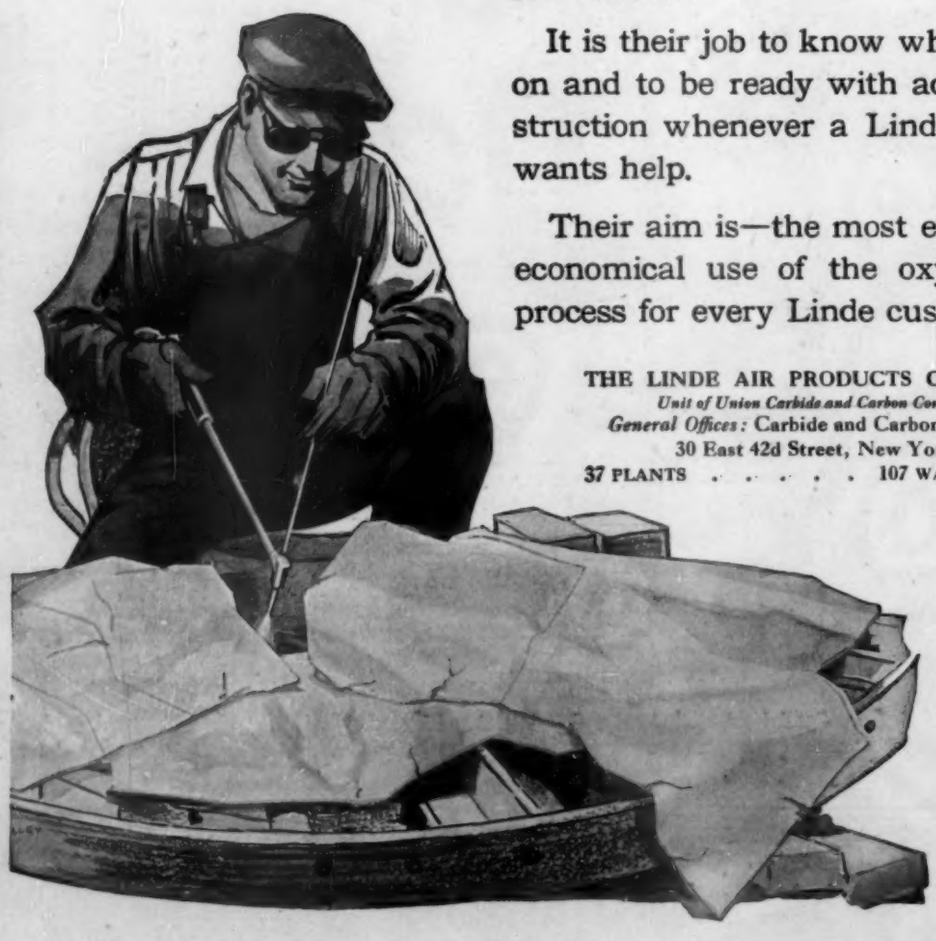
The WHY of Linde Welding Service

IN A FIELD that is developing and has developed as rapidly as that of oxy-acetylene welding and cutting, it is impossible for even the most alert welder or engineer to keep abreast of new developments.

That is one of the reasons for Linde's service staff.

It is their job to know what is going on and to be ready with advice or instruction whenever a Linde customer wants help.

Their aim is—the most efficient and economical use of the oxy-acetylene process for every Linde customer.



THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Company
General Offices: Carbide and Carbon Building
30 East 42d Street, New York
37 PLANTS . . . . . 107 WAREHOUSES

LINDE OXYGEN

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The "putting-on" tool

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But there *is* a putting-on tool. It is the Oxweld welding blowpipe. It puts on metal where metal is needed. A shaft worn thin can be built up to the proper size. Shear tables and crusher jaws that are ready for the scrap pile can be put back to work by putting on a little metal. And undersized parts can be reclaimed by this modern method.

Nor is that the whole story, for, with welding rods of Haynes Stellite or special alloy steels, the new "put-on" surface can be made better and actually wears longer than the original.

Do you know where the putting-on tool can help you in your business? It pays to be up-to-date.

THE PREST-O-LITE COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC
General Offices: Carbide and Carbon Building
30 East 42d Street, New York
31 Plants—88 Warehouses

22 years old and still growing

Prest-O-Lite
DISSOLVED ACETYLENE

The Welding Engineer

Founded by L. B. Mackenzie, 1916

Volume 12 August, 1927 Number 8

CONTENTS

A Thorough Course in Welding 25
By A. G. Odell

Oxygen Makers Meet in Montreal 29

Arc Welding of Stellite 32
By C. M. Rusk

Welded Fuselage Construction 34
By N. Damours

Safe, Economical Storage for Fuel Oils 37
By T. E. DePew

Editorial 23

Fall Meeting of American Welding Society 27

Developments in Underwater Cutting 36

A New Method of Bronze Welding 40

Arc Welders Used in Willys-Knight Body Assembly 42

News of the Welding Trade 46

The Spirit of Industrial Advertising

IF the readers of The Welding Engineer could have been behind the scenes at the Annual Meeting of National Industrial Advertisers they would have heard something of interest to themselves—something worth remembering. They would have gone away with the feeling that the manufacturer is just about as interested in satisfying the user's wants as he is in persuading the user to buy.

That sort of spirit is becoming more and more evident in industrial advertising. The wise reader of a paper like *The Welding Engineer* takes this into account, and he reads the advertising pages with the same confidence and the same eagerness for information with which he reads the welding articles.

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G. H. Mackenzie ..... President and Treasurer
M. J. Hungerford ..... Vice-President
H. S. Card ..... Secretary

H. S. Card ..... Editor
H. P. Ritsch ..... Associate Editor

Eastern Office—222 American Circle Bldg., New York
T. E. DePew, Eastern Manager
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Last Advertising forms close at 8:00 a. m. on the 12th. To show proof for correction copy must be received at an earlier date and allowances should be made for delay to mails. All copy should be in by the 12th of the month at the latest.

The Welding Engineer does not publish in its news or advertising columns any matter that deals with or refers to either personal or legal controversies.

Authorized Representatives

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SOUTH AFRICA—J. W. Arnison, 35a Victoria Ave., Benoni, Transvaal, South Africa.

Buyers' Index

Readers of The Welding Engineer will find this index to contain the most accurate information obtainable relating to welding apparatus and supplies. The advertising section includes the principal manufacturers of the United States.

ACETYLENE (Compressed in Cylinders)
Air Reduction Sales Co.
Commercial Acetylene Supply Co.
International Oxygen Co.
Prest-O-Lite Co.

ACETYLENE CYLINDERS
Keith Dunham Company
Pressed Steel Tank Co.

AIR LIQUEFACTION OXYGEN PRODUCING PLANTS
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ALUMINO-THERMIC WELDING
Metal & Thermit Corporation

ALUMINUM SOLDER
Weldene Corporation

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

APRONS (Asbestos)
Ideal Face Shield Co.

ASBESTOS INSULATED WIRE AND CABLE
Central Steel & Wire Co.

BLOW PIPES
See "Torches."

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Electric Arc Cutting & Welding Co.

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K-G Welding & Cutting Co.
Alexander Milburn Co.
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Oxweld Acetylene Co.
Torchweld Equipment Co.
U. S. Welding Co.
Williams & Co.

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Central Steel & Wire Co.
Lincoln Steel Co.
Steel Sales Corp.

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N. A. Strand & Co.
Wodack Electric Tool Corp.

BUTT WELDERS
See "Electric Resistance Welders"

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General Electric Co.
Gibb Welding Machines Co.
C. H. Hollup Corp.
Lincoln Electric Co.
Quasi-Arc Weldtrode Co.
Seneca Electric Arc Welder Co.
Una Welding and Bonding Co.
Westinghouse Elec. & Mfg. Co.
Wilson Welder & Metals Co.

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Shawinigan Products Corp.
Union Carbide Sales Co.

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Electric Arc Cutting & Welding Co.
Harris Calorific Co.
National Carbon Co.
Oxweld Acetylene Co.

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Craftsweld Equipment Co.
Harris Calorific Co.
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International Oxygen Co.
K-G Welding & Cutting Co.
Milburn, Alexander Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Torchweld Equipment Co.

CAST IRON SOLDER
Weldene Corporation

CONSULTING ENGINEER
E. F. Hollinger
R. C. Pierce

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Electric Arc Cutting & Welding Co.
General Electric Co.
Lincoln Electric Co.
National Carbon Co.
Una Welding and Bonding Co
Westinghouse Elec. & Mfg. Co.
Wilson Welder & Metals Co.

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Keith Dunham Company
Pressed Steel Tank Co.

CYLINDERS (Oxygen, Hydrogen)
Wm. Wharton, Jr. Co.

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N. A. Strand & Co.
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Electric Welding Machine Co.
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Lincoln Electric Co.
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Quasi-Arc Weldtrode Co.
Seneca Electric Arc Welder Co.
Stoody Co.
R. D. Thomas Co.
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Welding Service Co.
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Gibb Welding Machines Co.
Goodman Electric Machinery Co.
Taylor-Hall Welding Co.
R. D. Thomas Co.
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See "Cutting Electrodes"

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Chicago Steel & Wire Co.
Electric Arc Cutting & Welding Co.
General Electric Co.
Gibb Welding Machines Co.
C. H. Hollup Corporation
Lincoln Electric Co.
Lincoln Steel Co.
Page Steel & Wire Co.
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Roebling, John A., Sons Co.
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Seneca Electric Arc Welder Co.
Stoody Company
R. D. Thomas Co.
Una Welding and Bonding Co.
Welding Service Co.
Williams & Co.
Wilson Welder & Metals Co.

ELECTRODE HOLDERS
Allan Mfg. & Welding Co.
American Steel Engineering Co.
Burke Electric Co.
Electric Arc Cutting & Welding Co.
Electric Welding Machine Co.
Fibre-Metal Products Co.
General Electric Co.
Gibb Welding Machines Co.
C. H. Hollup Corp.
Lincoln Electric Co.
Northwestern Mfg. Co.
Owen Electric Mfg. Co.
Seneca Electric Arc Welder Co.
R. D. Thomas Co.
Una Welding and Bonding Co.
Welding Service Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co.
Wilson Welder & Metals Co.

ELECTRODE TIPS (Resistance Welding)
Elkon Works, Inc.

ELECTROLYTIC OXYGEN AND HYDROGEN GENERATING EQUIPMENT
International Oxygen Co.

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American Steel Engineering Co.
Burke Electric Co.
Electric Arc Cutting & Welding Co.
Electric Welding Machine Co.
Fibre-Metal Products Co.
General Electric Co
Gibb Welding Machines Co.
C. H. Hollup Corp.
Ideal Face Shield Co.
Lincoln Electric Co.
Northwestern Mfg. Co.
Owen Electric Mfg. Co.
Quasi-Arc Weldtrode Co.
Seneca Electric Arc Welder Co.
Stoody Company
Strauss & Buegeleisen
R. D. Thomas Co.
Una Welding and Bonding Co.
Westinghouse Elec. & Mfg. Co
Williams & Co.
Wilson Welder & Metals Co.
Willson Goggles, Inc.

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American Brass Co.
Central Steel & Wire Co.
Craftsweld Equipment Co.
Oxweld Acetylene Co.
C. H. Hollup Corp.
Imperial Brass Mfg. Co.
Lincoln Steel Co.
Page Steel & Wire Co.
Reid-Avery Co.
Roebling, John A., Sons Co.
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Steel Sales Corp.
Stoody Co.
Stulz-Sickles Co.
R. D. Thomas Co.
Torchweld Equipment Co.
Welding Service Co.
Weldit Acetylene Co.
Williams & Co.

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General Electric Co.

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Carbic Mfg. Co.
Metal & Thermit Corp.
Central Steel & Wire Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Torchweld Equipment Co.
Weldene Corporation
Weldit Acetylene Co.

GAS SAVING DEVICES
Harris-Calorific Co.
U. S. Welding Co.
Weldit Acetylene Co.

GLOVES (Asbestos)
Ideal Face Shield Co.

GAUGES
Moto Meter Co.
National Gauge & Equipment Co.

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Carbic Mfg. Co.
Craftsweld Equipment Co.
M. Keith Dunham
Imperial Brass Mfg. Co.
Milburn, Alexander Co.
Modern Engineering Co.
Oxweld Acetylene Co.
U. S. Welding Co.

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Ideal Face Shield Co.
Strauss & Buegeleisen
Willson Goggles, Inc.

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422 East Bay Street, Jacksonville, Fla.

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206 Third Avenue, South, Seattle, Wash.
703 Pacific Avenue, Tacoma, Wash.
329 Everett Street, Portland, Oregon.

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136 Liberty Street, New York.

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129 South Jefferson Street, Chicago, Ill.

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901 Pennsylvania Avenue, N. S.,
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2701 Seventh Ave., North,
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(South America, West Indies, Continental Europe, Northern Manchuria)
Philadelphia, Pa.

International Railway Supply Co.
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30 Church Street, New York City

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(Great Britain, Ireland, South Africa, India, Australia, New Zealand, Denmark, Spain, Portugal)
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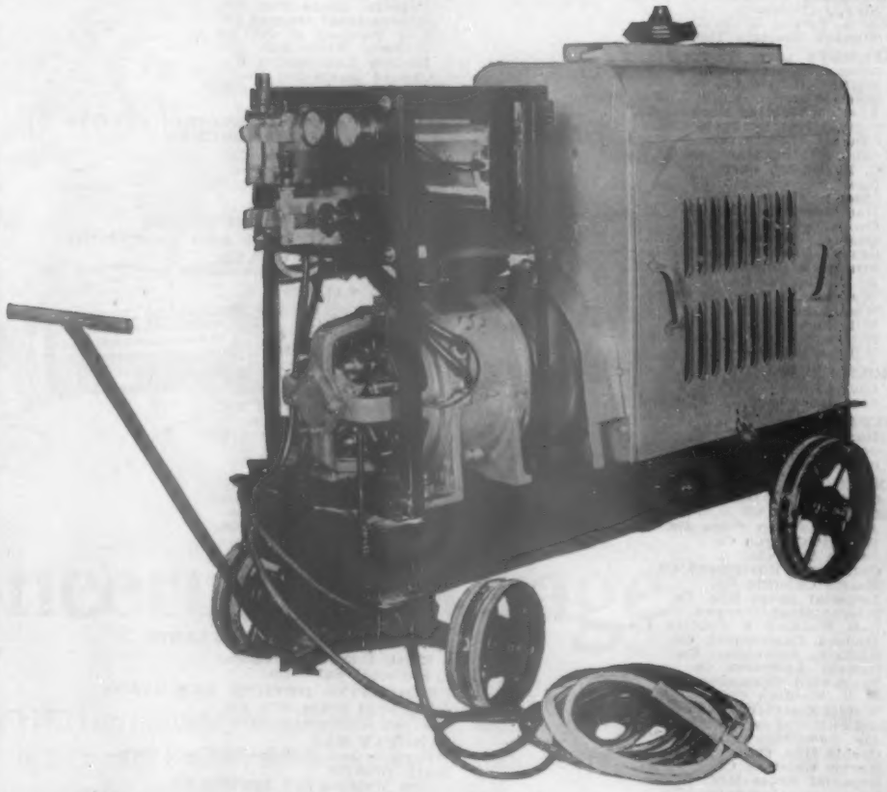
London, S. W. 1., England.

1001 New Birks Bldg., Montreal, Canada



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This Wilson Type S single operator gasoline-engine-driven electric welding machine has been tried and proven throughout the world. It is a complete, self-contained unit, easily moved, and operates by the simplest control panel yet devised. It has a range of 25 to 250 amperes, and welds with electrodes 1/16" to 1/4" in diameter. 20 H.P. Continental Engine. Weight, 1600 pounds. For full information, write today. Export prices on request.

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Electric Welding Machine Co.
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General Electric Co.
Gibb Welding Machines Co.
C. H. Hollup Corp.
Ideal Face Shield Co.
Lincoln Electric Co.
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Owen Electric Mfg. Co.
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Seneca Electric Arc Welder Co.
Strauss & Buegeleisen
R. D. Thomas Co.
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Wilson Welder & Metals Co.
Willson Goggles, Inc.

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See also under "Needle Valves"

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International Oxygen Co.

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International Oxygen Co.
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Modern Engineering Co.
Milburn, Alexander, Co.
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Torchweld Equipment Co.
U. S. Welding Co.
Weldit Acetylene Co.

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Milburn, Alexander, Co.
Modern Engineering Co.
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U. S. Welding Co.

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Harris Calorific Co.
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International Oxygen Co.
K-G Welding & Cutting Co.
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Modern Engineering Co.
Oxweld Acetylene Co.
Stoody Company
Torchweld Equipment Co.
U. S. Welding Co.

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See "Fire Proof Plastic Material"

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Torchweld Equipment Co.
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Carbic Mfg. Co.
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Harris Calorific Co.
Imperial Brass Mfg. Co.
International Oxygen Co.
K-G Welding & Cutting Co.
Milburn, Alexander, Co.
Oxweld Acetylene Co.
Stoody Company
Torchweld Equipment Co.
U. S. Welding Co.
Welding Service Co.
Weldit Acetylene Co.
Williams & Co.

SEAM WELDERS
See "Electric Resistance Welders"

SPOT WELDERS
See "Electric Resistance Welders"

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International Oxygen Co.
K-G Welding & Cutting Co.
Milburn, Alexander, Co.
Oxweld Acetylene Co.
Torchweld Equipment Co.
U. S. Welding Co.

THERMIT WELDING
Metal & Thermit Corp.

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Air Reduction Sales Co.
Burdett Oxygen Co.
Carbic Mfg. Co.
Craftsweld Equipment Co.
Harris Calorific Co.
Imperial Brass Mfg. Co.
International Oxygen Co.
K-G Welding & Cutting Co.
Milburn, Alexander, Co.
Modern Engineering Co.
Oxweld Acetylene Co.
Stoody Company
Torchweld Equipment Co.
U. S. Welding Co.
Welding Service Co.
Weldit Acetylene Co.
Williams & Co.

TRUCKS (Cylinder)
Air Reduction Sales Co.
Imperial Brass Mfg. Co.
International Oxygen Co.
Torchweld Equipment Co.

VALVES
Air Reduction Sales Co.
Burdett Oxygen Co.
International Oxygen Co.
Kerotest Mfg. Co.

WELDING COMPOUND (for Shape Welding)
Air Reduction Sales Co.
Harris Calorific Co.
Joseph Dixon Crucible Co.
Modern Engineering Co.
National Carbon Co.

WELDING ROD HOLDERS
C. Sorensen

WELDING RODS AND WIRE
See "Electrodes" and "Filler Rods"

ALPHABETICAL INDEX TO ADVERTISERS

A

Air Reduction Sales Co. 3
Allan Mfg. and Welding Co. 55
American Brass Co., The 45
American Steel Engineering Co. 47
American Welding Society 48
Anti-Borax Compound Co. 58

B

Burdett Oxygen Co. 49
Burke Electric Co. 57

C

Carbic Mfg. Co. .....
Carbide and Carbon Chemical Corp. ....
Central Steel & Wire Co. 19
Chicago Steel & Wire Co. 50
Commercial Acetylene Supply Co. 51
Craftsweld Equipment Co. 55

D

Dixon Crucible Co., Joseph 51
Dunham, Keith, Co. .....

E

Elec. Arc Cutting & Welding Co. ..Back Cover
Electric Welding Machine Co. .....
Elkon Works, Inc. .....Inside Back Cover

F

Federal Machine & Welder Co. 53
Fibre Metal Products Co. .....

G

Gas Products Assn. 13
General Electric Co. .....Front Cover 13
Gibb Welding Machine Co. 54
Goodman Electric Mach. Co. 47

H

Harris Calorific 19
Heylandt Sales Co. 58
Hollup, C. H. .....
Hoxite Company .....

I

Ideal Face Shield Co. 57
Imperial Brass Mfg. Co. 58
International Oxygen Co. 51

K

Kerotest Mfg. Co. 20
K-G Welding Co. 49

L

Lincoln Electric Co. 16
Lincoln Steel Co. 17
Linde Air Products Co. 2
Lundy, E. A., Co. .....

M

Metal and Thermit Corp. .....
Modern Engineering 15
Moto Meter Co. 14

N

National Carbide Co. 50
National Carbon Co. .....
National Gauge and Equipment Co. 14
Northwestern Mfg. Co. 54
Norgren, C. A., Co. 58

O

Owen Electric Mfg. Co. 18
Oxweld Acetylene Co. 24

P

Page Steel & Wire Co. 52
Pierce, R. C. 58
Pressed Steel Tank Co. 52
Prest-O-Lite Co., Inc., The 4

Q

Quasi-Arc Weltrode Co. 58

R

Reid-Avery Co. 11
Roebling, John A., Sons Co. 22

S

Seneca Electric Arc Welder Co. 54
Sorensen, C. 47
Shawinigan Products Corp. 55
Standard Steel & Wire Co. 47
Stevenson Distributing Corp. 56
Steel Sales Corp. .....
Strauss & Buegeleisen 58
Strand, N. A., & Co. 58
Stoody Co. 57

T

Taylor-Hall Welding Co. 47
Thomas & Co., R. D. .....
Torchweld Equipment Co. 53

U

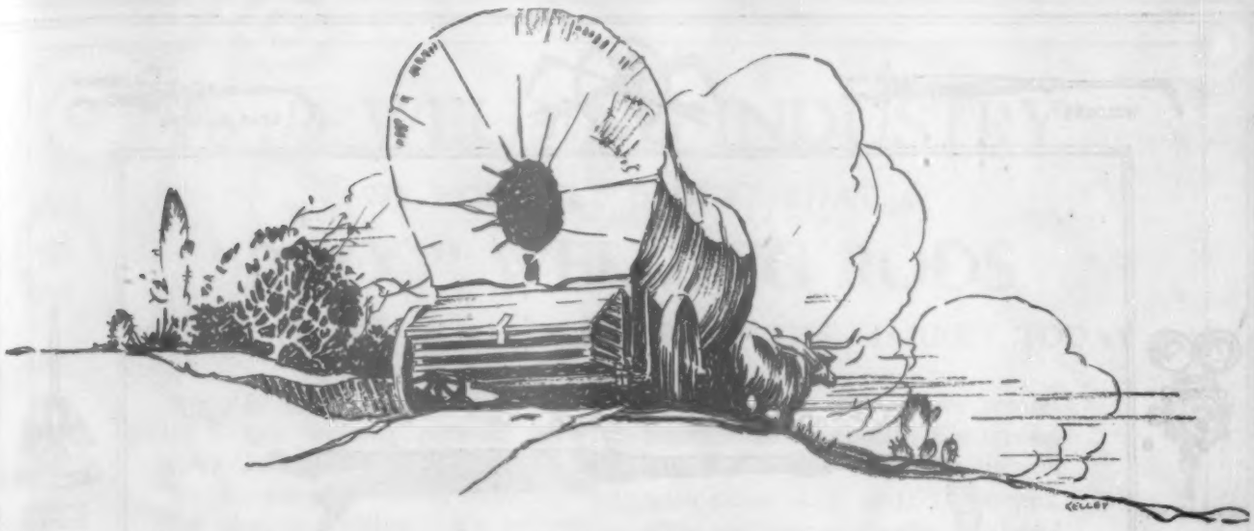
Una Welding & Bonding Co. 21
Union Carbide Sales Co. 9
U. S. Welding Co. 10

V

Vulcan Electric Brazing Co. .....

W

Weldene Corporation .....
Weldit Acetylene Co. 56
Welding Service Co. 55
Westinghouse Electric & Mfg. Co. .....
William Wharton, Jr., & Co., Inc. .....
Williams & Co., Inc. 54
Willson Goggles, Inc. 57
Wilson Welder & Metals Co. 7
Wodack Electric Tool Corporation 47



Pioneering courage

WHEN an industry has become great, one is likely to forget that in the beginning the odds were overwhelmingly against it and that its very life depended on one thing—the courage of the men behind it.

So it is with Union Carbide. The dramatic accident of the discovery of calcium carbide, by men who later founded the Union Carbide Company, fired their imaginations with its great industrial possibilities.

Difficulties must have seemed insuperable. Yet in the face of these odds a process that would yield uniform and high quality product was developed, new uses for carbide and its child acetylene were discovered and equipment that would make these uses practical was invented.

Today, the great welding and cutting industry with its innumerable applications, the thousands of farms lighted with acetylene and the cheap and efficient mine and marine lighting systems, are a few of the things that stand as monuments to the pioneer courage that made them possible.

UNION CARBIDE SALES COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

Carbide and Carbon Building, 30 East 42d Street, New York

Peoples Gas Building, Chicago, Ill. Adam Grant Bldg., San Francisco, Cal.

WELDERS

LEAD BURNERS

REGULATORS

SPECIAL BURNERS

TANK VALVES

MANIFOLDS

G M C MODEL No. 12

WELDING TORCH AND CUTTING HEAD

"TRIED AND FOUND NOT WANTING"

One of the most popular combinations ever offered the welding and cutting fraternity.

GASAVERS

ACETYLENE GENERATORS

COMPLETE OUTFITS

GENERATOR OUTFITS

THE HARRIS CALORIFIC COMPANY

"The Most Complete Line in America"

2828 Washington Avenue, Cleveland, Ohio

With which is now merged the U. S. Welding Co., formerly of Minneapolis, Minn.

AUTOMATIC TORCHES

CUTTERS

PREHEATERS

To the WELDING INDUSTRY

WE HONESTLY BELIEVE THAT

"RACO" WELDING RODS

ARE THE FINEST QUALITY RODS ON THE MARKET TODAY

WE manufacture bare electric welding rods of both Pure Iron and Mild Steel analysis. We do not recommend bare rods for electric welding. We believe that the manufacture of a good electrode only starts with a bare wire. However, as large quantities of bare electrodes are used throughout the country, we supply them to those who desire this class of material.

We believe our oxy-acetylene welding rods are the most perfect rods of this type on the American market. They are manufactured from steel and iron made expressly for the purpose. These wires are drawn and copper coated under the direct supervision of our Wire Drawing Superintendent, who has been drawing this type of wire for twenty-five years in France, Italy and Switzerland. The extremely high quality of material used and finish make it a pleasure to use "RACO" gas welding rods.

For electric welding we recommend Raco Composite Electrodes. These rods are used equally well with either A. C. or D. C. current. This rod was originally developed for automatic welding where bare wire will not function due to great speed in welding and high amperage used. The Composite Rod is recommended for all work where bare and covered electrodes have previously been used. Greatly increased speed and far better penetration is secured and absolute uniformity of rods throughout an order is absolutely guaranteed. A special flux of truly wonderful characteristics is inlaid in the lengthwise grooves the entire length of the wire. The flux is protected in the grooves and cannot chip out, even when the wire is bent flat against itself. The accurate depth of the grooves automatically regulates the correct amount of flux needed.

The Composite Wire is furnished on reels for automatic arc welding and will give perfect results under special conditions of high speed and high amperage. The flux in the grooves contains a high percentage of titanium and will weld Cast Iron with better results than any electrode on the market today.

Our Company specializes in drawing welding wire only. We have no other interests and can give our welding rods our undivided attention.

Raco Welding Rods are fairly priced and we are able to give real service from our new plant at Dundalk, Maryland.

REID-AVERY COMPANY, INC.

MARSHALL E. REID, President.

Main Office:
21st and Washington Ave.
PHILADELPHIA, PA.

Works:
DUNDALK, MD.

An 18-Inch Riser

or a

Radio Condenser

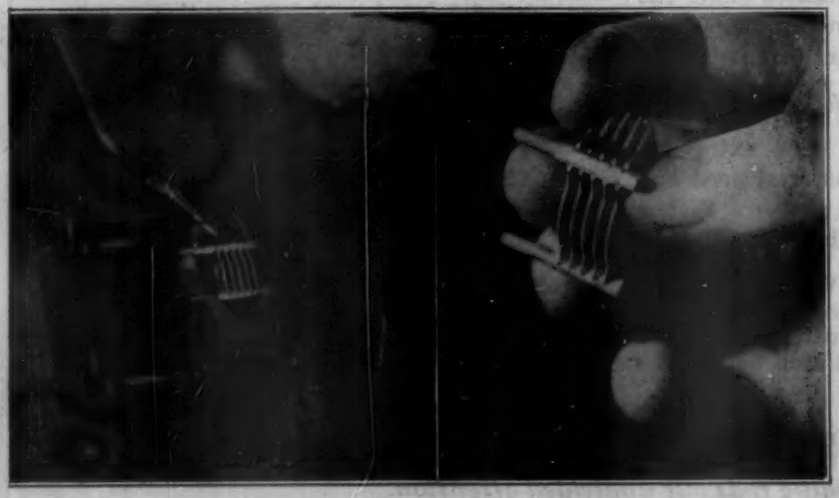
Whether the job is the cutting of a large riser, weighing tons, from a heavy steel casting or the soldering of a delicate radio condenser HIGH PURITY OXYGEN is an essential to good workmanship.

In production work of this kind a **constant** and **reliable** source of supply for pure oxygen is just as necessary as a constant delivery of other raw materials.

There are over **100 plants and warehouses** of the Gas Products Association conveniently located in every large city and industrial center ready to fulfill your oxygen requirements, assuring a continuous and unequaled source of supply.

Upper Photograph—Cutting an 18 in. x 26. Steel Riser From a 15 Ton Mill Housing

Lower Photograph—The Cut was Clean and Smooth as Shown and the Riser was Lifted from the Casting with a Crane.



Left Hand Photograph—A Variable Condenser Set in a Special Jig During the Application of Soft Solder to the Plates and Posts.

Right Hand Photograph—The Completed Plate Assembly of the Variable Condenser.

OXYGEN PURITY HYDROGEN 99% ABOVE GAS PRODUCTS ASSOCIATION

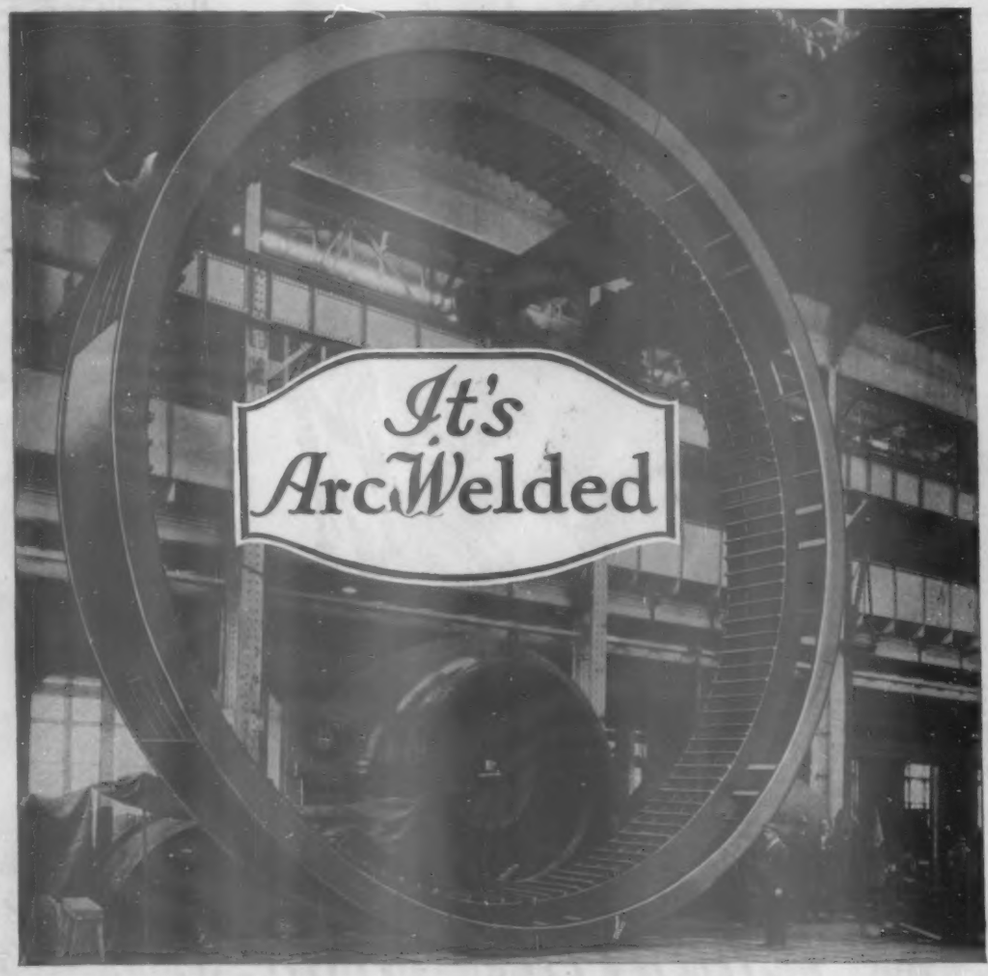
Please Write to the Association Headquarters for Further Information

See previous issues for list of members, plants and warehouses.

Gas Products Association

140 So. Dearborn St. Chicago, Ill.

First to Advocate High Purity Oxygen



The Giant of Conowingo

This G-E generator frame, for the Conowingo water-power development, is a better frame because it is completely fabricated by arc welding. It is not only lighter, but stronger —there can be none of the hidden defects sometimes present in castings.

Fewer and simpler processes are involved from drafting room to finished frame. There is less drafting, no pattern work, no foundry work, less machining—and there is a smaller outlay for equipment.

Today is the time for fabricators of iron and steel to begin using this new method of construction. Forge ahead now by getting in touch with your nearest G-E office.

General Electric furnishes to the Welding Industry:

- WD Arc Welders—designed for one operator
- Constant Potential Sets—for several operators
- Arc Welding Resistors—for mining and traction companies
- Automatic Sets—for repetition work

Complete information and bulletins available at your nearest G-E office.

530-32

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

This well-known statue of Gen. Sherman and the Angel of Victory is located at the Park Plaza, 5th Avenue and 59th Street, New York City.

Enduring Bronze

BRONZE for permanence! That's part of the reason why Natweld Bourdon Springs are reliable under all conditions of service for years and years.

The rest of the reason lies in the care with which enduring bronze is processed, by Natweld methods, to its finished form as a perfected Natweld Spring.

Since a gauge is only as good as its spring, you can appreciate why Natweld Gauges are so popular today. And don't forget that volume production plus quantity sales have brought their prices to an extremely reasonable basis.

The National Gauge and Equipment Co.
La Crosse, Wisconsin
A Division of the MotoMeter Co.

The MotoMeter Company,
Long Island City, N. Y.
The MotoMeter Co. of Canada, Ltd.
Hamilton, Ontario

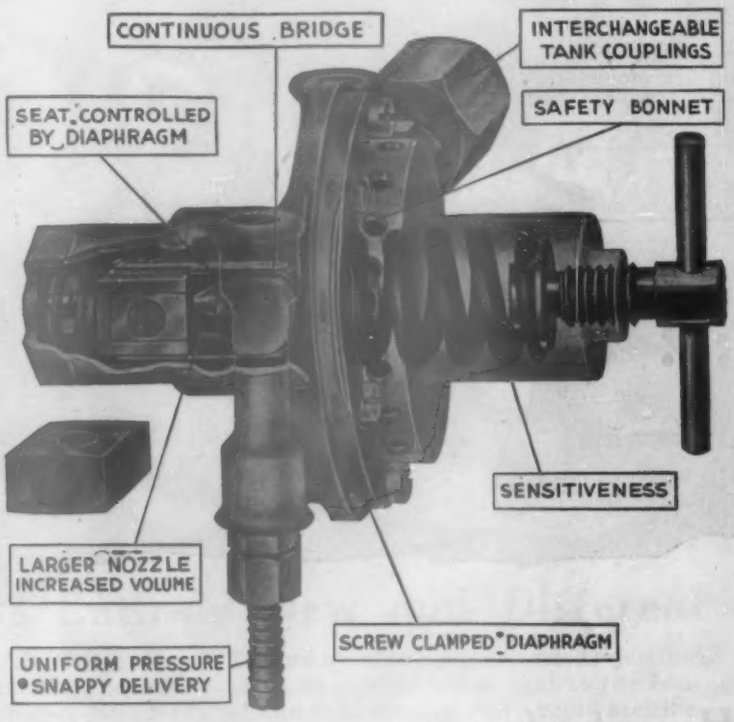
Chicago Office: 620 Tower Court
Representative in Illinois, Indiana, Wisconsin, Minnesota and Missouri
Joseph Halla, 140 South Dearborn Street,
Chicago, Illinois

NATWELD GAUGES

Meco

OXY-ACETYLENE APPARATUS

Approved by the Underwriters



It means money in your pocket to chase the worries out of the welding department, and MECO-MULTI-SEAT Regulators will do that. It's in the construction, of course, and here are the details:—

Four seats instead of one. Four times the life and one fourth the loss of time for replacement. Perfect support on sides and bottom of seat.

Accurate fit of seat guarantees accurate regulation.

The continuous bridge insures long life and safety.

Metallic diaphragm does not lose its elasticity.

The whole construction so simple and parts so perfectly standardized that any mechanic can make repairs.

TYPE GC REGULATOR

MODERN ENGINEERING CO.
3411 Pine Blvd. St. Louis, Mo.

Sales and Service in All Parts of the United States. Write for Address of Our Nearest Representative.

What Will Pop's Money Say?

"Here, Lad . . .

don't you come to me for any money to try out that new blue-colored welding rod. I'm not buying color in welding rod. I'm buying metal and I've got prices down to bedrock on our present rod.

"Money is the only thing that talks with me."

"Yes, Pop . . .

and when you buy that cheap rod it usually says 'I have went.'

With this new 'Stable-Arc' BLUE Rod (non-splashing) you get something for the money and in that case it says: 'Dear Sir:—You are about to be introduced to a rod that is non-splashing—that helps the operator get out more work and better work in less time. You've really invested in a means toward an economical end—and you develop the operator's good will as a by-product—and "Stable-Arc" BLUE is the buy word.'

And Pop, we can Scotch on the money to try out that rod. Lincoln will gladly send a free sample to any operator who will promise to write back what he thinks about the rod after he tries it."

A new text book on Arc Welding (Price $1.50) will be sent on approval for five days to any executive requesting it.

Book size, 6"x9"—Total pages, 150—Number illustrations, 200—Charts, 62—Divisions, 8.

The Lincoln Electric Co., Dept. No. 27-8 Cleveland, Ohio

WF 9

LINCOLN "Stable-Arc" WELDER

Try this new way of Bronze welding with

"KORO"

(Patent applied for)

TOBIN BRONZE WELDING ROD

A Rod That is Entirely New and Different

BRONZE welding with KORO Tobin Bronze is faster because the rod melts more rapidly, and better because less heat is used. The KORO rod is genuine Tobin Bronze, manufactured by The American Brass Company, and processed in our own plant so as to leave on each rod a series of shallow knurled grooves, into which is forced a special flux developed by us for use with this rod. This patented process is used exclusively by us in the production of the famous KORO Flux Coated Electrodes.

The many sharp edges and projections serve as conductors of heat to the body of the rod, causing more rapid melting. Our own special flux is forced into the grooves in just the right proportion to insure perfect fusion. No flux can is needed, no time is lost dipping rod in flux, no flux is wasted, and the entire rod is deposited continuously, smoothly, uniformly. The rod stands rough handling without losing flux. It has been tried and approved by several of the largest welding departments in America.

These Advantages are Exclusive with KORO TOBIN BRONZE

1. Genuine Tobin Bronze of proven uniform quality.
2. Knurling to bring about more rapid melting.
3. Flux applied to rod to eliminate waste of time, gas and flux.
4. Flux properly proportioned to size of rod.
5. Danger of overheating bronze eliminated.
6. Continuous deposit improves quality of weld.
7. No danger of spoiling weld by using excess flux.
8. No loss of flux from spilling, careless handling or exposure.
9. Uniformity of work aids in standardizing procedure.
10. Time saved by eliminating useless operations.

See OUR EXHIBIT NATIONAL STEEL & MACHINE TOOL EXPOSITION DETROIT CONVENTION HALL Sept. 19-24 BOOTH No. 146

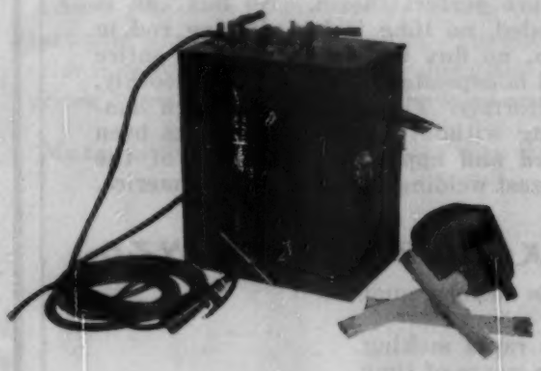
Send a Trial Order for KORO TOBIN BRONZE and try it on your work

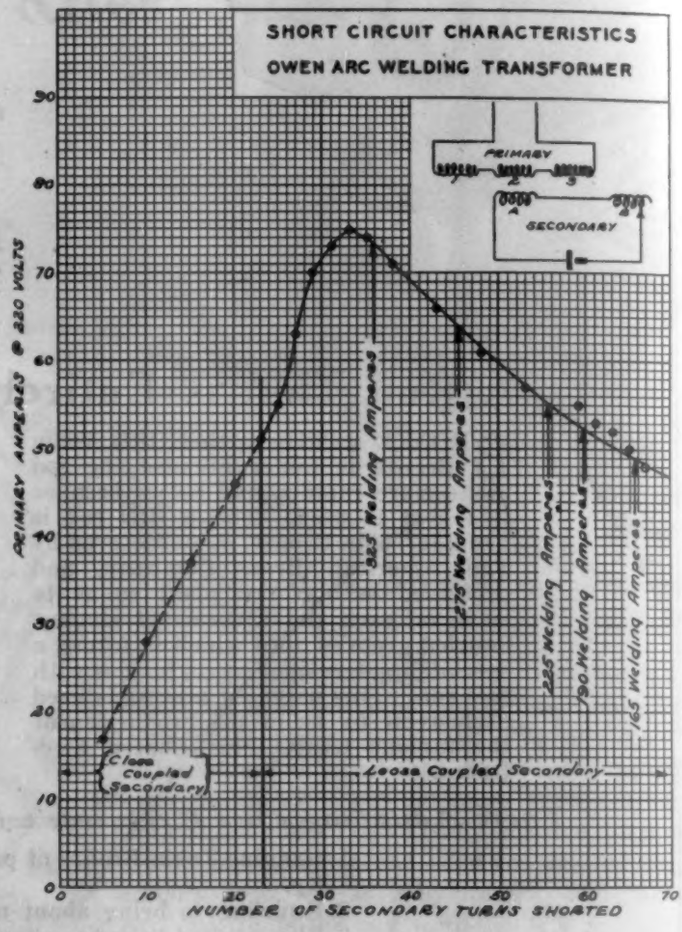
LINCOLN STEEL COMPANY (Koro Division)
229 W. Illinois St.
Chicago
U. S. A.

WHY is the OWEN TRANSFORMER ARC WELDER different?

BECAUSE the OWEN is designed on entirely different principles

A careful study of the accompanying graph will convince you of this fact.





The peculiar design and construction of the Owen arc welding apparatus permits of ample core and copper area, thus insuring cool and uninterrupted operation on all classes of work, at the same time keeping the weight at a minimum.

OWEN ELECTRIC MANUFACTURING COMPANY
Fayetteville, North Carolina

SWEDOX

WELDING RODS, WIRES and ELECTRODES

SWEDOX Welding Rods and Wires, differing widely in chemical and physical properties, have one common quality. Each brand is made for a particular welding requirement.

When you consider the care that must be exercised in the selection of metal for different construction requirements, it becomes apparent that equal care is necessary in selecting filler material for welding the joints in these constructions.

The SWEDOX line has been developed so as to furnish on each welding job the welding wire which will enable the welder to get the most satisfactory result. There is a SWEDOX wire for your work. Try it, and you'll know why SWEDOX customers come back.

Central Steel & Wire Company

CHICAGO, ILL.
4545 S. Western Blvd.
Lafayette 8500

DETROIT, MICH.
5001 Bellevue Ave.
Lincoln 6780

Main Warehouses and General Offices, Central Steel & Wire Co., Chicago.

KEROTEST

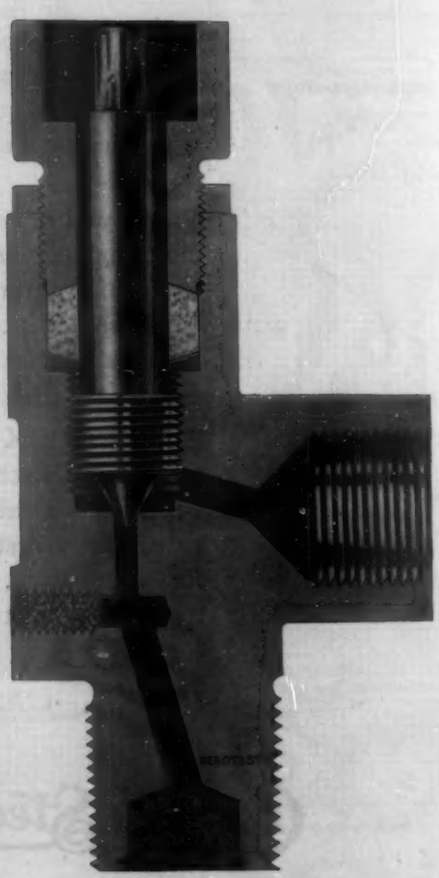
PITTSBURGH VALVES

Pittsburgh Valves are the recognized Quality Standard Cylinder Valves for every Compressed Gas Service.

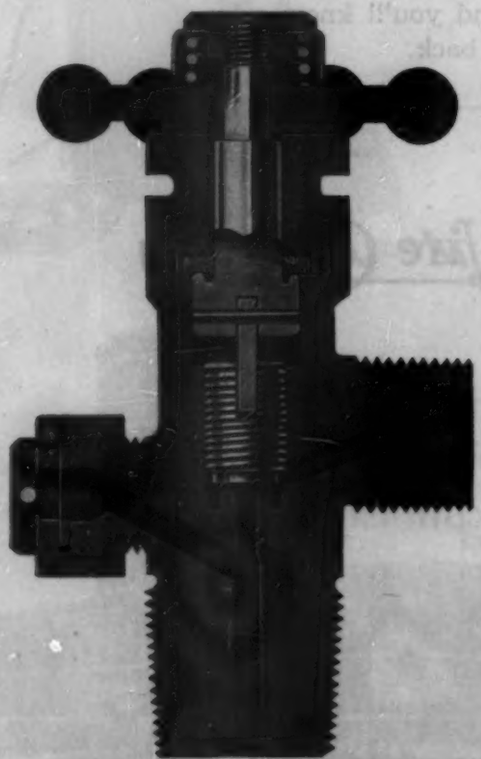
The majority of Gas Manufacturers have adopted Pittsburgh Valves as their standard equipment.

The reasons are obvious:

Advanced Design
Highest quality Materials
Precision manufacture
Ease of Operation
Continuity of service



¾" TYPE 95—TYPE 98—1"
ACETYLENE



HYDROGEN—TYPE 306—OXYGEN

SPECIFY PITTSBURGH VALVES FOR YOUR CYLINDERS

THERE IS NONE BETTER. For use on

Oxygen	Acetylene
Hydrogen	Liquified Petroleum
Garbonic Gas	Chlorine
Ammonia	Sulphur Dioxide

Kerotest Manufacturing Company
2525 Liberty Avenue
Pittsburgh, Pennsylvania

UNA Welders

IN Una Welders both the A. C. supply and D. C. generating circuits are combined in a single, compact machine. The advantages of this type of construction are:

1—A simple, two bearing machine requiring no alignment.

2—Maximum electrical capacity for a given weight of material.

3—Operates as a synchronous motor with a resulting high power factor.

4—Unusual arc stability. Any change in arc resistance must be instantly equalized by a change in arc voltage or the arc will break. IN UNA WELDERS THIS VOLTAGE CHANGE TAKES PLACE AT ELECTRICAL SPEED, THE HIGHEST SPEED KNOWN. This accounts for the unusual arc smoothness and welding ease of these welders and results in better weld metal and faster welding.

UNA Welders are available for A. C. and D. C. Power Circuits in single or double operater units—300 to 450 ampere capacities.

A few choice sales territories still open—Write for complete proposition

UNA Welding and Bonding Co.

1617 Collamer Road, Cleveland, Ohio.

ROEBLING WELDING WIRE

For All Designs of Electric Welding Equipment

Roebling Electrodes are carried in all standard sizes (length 14 inches); any other sizes required are manufactured to order. Guaranteed absolutely uniform throughout, and will make perfect welds with the least amount of trouble. Roebling Welding Wire is giving utmost satisfaction wherever used. From actual tests it has demonstrated its efficiency and dependability.

SPECIFY ROEBLING

and there will be no comebacks as far as the wire is concerned. You can always rely upon the uniformity and flowing quality of every grade.

John A. Roebling's Sons Co.
Trenton New Jersey

EDITORIAL

The National Power Show

THE Sixth National Exposition of Power and Mechanical Engineering will be held at the Grand Central Palace, New York, from December 5th to 10th, inclusive, and at the same time as the Exposition is held the annual meetings of the American Society of Mechanical Engineers, American Society of Refrigerating Engineers, will be held. Numerous other organizations will meet at the same time at the Exposition; some of these will meet jointly with, or in bodies attend the Exposition.

The number of exhibitors this year is already considerably increased over last year. There are now more than 500 exhibitors and the exhibits will include approximately some 400 exhibits of power generation, distribution and utilization; between 200 and 250 exhibits will include heating and ventilating equipment, and refrigeration for large scale industries, factories, office buildings, apartment, public and assembly buildings, and homes. Between 100 and 150 exhibits will show instruments for control of time, pressure, temperature, volume, or what other element requires precision in its measurement or recording. There will be about 125 exhibits or more of machine shop equipment, including metal and wood working machines, transmission equipment, tools and machine tools, and in this phase of the Exposition's activities, there has been a marked increase in number of exhibits. There are many new outstanding exhibits of transmission equipment. There will be numerous exhibits of materials handling equipment. Mechanical exhibits of all kinds will lead the way to the complete equipment of every industrial plant.

A Substitute for Specifications

WHATEVER doubt exists regarding the possibility of writing adequate specifications for welding wire seems to be well founded. Nearly every trail leading to quantitative determinations ends in the deep woods, and the investigator comes back to hunt for a new trail in the hope of getting somewhere. Some progress toward the desired end could doubtless be made by the establishment of an impartial bureau to examine not only wire but all products used in welding and label them for satisfactory serviceability, just as many pieces of apparatus are labeled for safety of construction and operation. Such procedure would put the specification on the end result—where it would do the most good.

Make Use of the "Human Element"

TO those who are afraid to place responsibility upon a welded joint because of the uncertainty of the "human element," we should like to extend an invitation to come with us to a large plant or two where there is a properly organized welding department, and to talk with a number of typical welders. In our own visits to the plants we usually find a chance to chat with the operators about their work, and almost always we find a keen interest in their work and a pride in good workmanship. Welders frequently call at The Welding Engineer offices, and one reason why we enjoy those visits is because there is usually in their conversation that intelligent attitude toward their own work that won't let a man make a poor weld. In such cases the "human element," properly guided, makes for good welding.

As for the supply of competent welding operators today, a remark in a recent article in the Oil and Gas Journal is worth pondering. When the Magnolia Pipe Line Company laid their first welded line less than three years ago, they were obliged to open a welding school in order to insure the competence of the welders. When they began a new 200-mile line recently, requiring several hundred welders, they found it unnecessary to organize such a school. The supply of skilled welders was already available. Nevertheless, the welding force was well organized, and an effective system of checks on workmanship was carried out. The results on this important high-pressure job proved conclusively that, provided the welding force is properly organized and supervised, there never need be any hesitancy to apply a welding process because of the "human element."

The Opportunity School

DENVER has attracted the attention of the educational world through the splendid work of its Public Opportunity School. Mr. Odell's article in this issue tells us how welding is taught in this institution and implies that other industrial arts are handled in a similar manner. Many of the best posted men in welding circles will be surprised at the broad scope of this course, which is offered without cost and practically without restriction. After reading the description of the work done in a four-year course some very definite impressions remain. It is apparent that a thorough knowledge of welding requires schooling in several sciences. It becomes easier to understand why men unfamilar with the fundamental sciences involved, yet well experienced in many practical aspects of welding, can differ so radically in their opinions concerning what seem to be simple points. The importance of having supervisors study welding increases. The requirements or qualifications of a good supervisor assume more definite shape. These impressions multiply, but there is one which seems to stand almost by itself in real significance. That is that teaching the art of welding is a big, responsible job, a job which cannot be done well with a background of superficial knowledge. The Opportunity School shows how much can be done and shows a desire to do more. Such a school would make an excellent training center for welding instructors.

Betting Millions on Welding

WHILE visiting a manufacturing plant recently, one of the foremost engineers in the welding found that the whole success of the plant, estimated to cost about forty million dollars, depended upon the successful execution of two small welds in each unit of the product. Porous welds would mean enormous losses in this case, but porous welds were a very rare occurrence, so there are profits from this business, instead of losses. It would be interesting to know how many of the stockholders have as much confidence in welding as the plant executives have. Yet this confidence in the process is not unusual in our industries. We have seen huge steel boilers lifted by welded fittings and carried through the shops while the men who made the welds worked unconcernedly below. It is not difficult to have confidence in the process after learning how to compare it fairly with all other known methods of joining metals.

"Please find us 30 welders"

SIMILAR REQUESTS come in to many Oxweld district offices because contractors, construction companies, and industrial men generally have come to realize that Oxweld is in touch with every kind of oxy-acetylene development and knows where good welders can be located.

Oxweld certainly does not want to become an employment agency, yet this is a definite and valuable clearing house service for Oxweld customers, which we are glad to undertake.

And again, thousands of welders who use Oxweld blowpipes also know the Oxweld organization and trust it. That is high tribute indeed.

OXWELD ACETYLENE COMPANY
Unit of Union Carbide and Carbon Corporation

CHICAGO
3642 Jasper Pl.

UCC

SAN FRANCISCO
1050 Mission St

LONG ISLAND CITY, N. Y.
Thompson Ave. and Orton St.

STOCKS IN 39 CITIES

In Canada: Dominion Oxygen Company, Ltd., Toronto

Oxweld

WELDING AND CUTTING APPARATUS

A Thorough Course in Welding

Men Trained According to the Standards of the Denver Opportunity School Are Competent to Supervise Welding Operations

By A. G. Odell*

THE classes in the art of Welding at the Opportunity School have the following aims:

KNOWLEDGE: An understanding of the welding processes and their possibilities. A thorough knowledge of the principles of physics and metallurgy involved in making a good weld. A knowledge of metallography. A knowledge of the limitations of the processes. A knowledge of every unit of the apparatus used. Complete knowledge of all the common metals and the methods of identifying and welding each of them.

SKILL: Skill in handling the apparatus with confidence and proper regard for safety considerations. Ability to make minor repairs and adjustments. Ability to recognize different metals and select the right procedure for welding each of them. Ability to plan and carry out each job with the least possible expenditure of gas, current and time. Ability to secure *perfect fusion* and *thorough penetration* on *every weld*. Ability to test his own work, recognize defects and overcome them. Ability to dispose work and apparatus so as to weld with maximum comfort and efficiency.

Welding Staff of Opportunity School. A. G. Odell, Technical Director. Rachael Isabel, Teacher of Metallurgy and Metallography. J. P. Adams, Instructor in Welding Shop.

Training

Welding has come upon the scene at a period in the world's economic development when the rule of thumb method has been supplanted by scientific research. We are fortunate in this respect for, instead of blind groping, our forces can be intelligently marshalled to get results.

The development and application of welding will be hastened through the training of Welding Efficiency Engineers, as welding is becoming more and more a specialized profession and trade.

Broadly speaking, the fields for training include:

Engineers, designers and draftsmen, supervisors, inspectors, foremen, welders, practical instructors and the most important, instructors for schools, universities and colleges.

Successful extension of welding absolutely depends upon the engineer. This point cannot be stressed too strongly, for the mechanic generally speaking, is unable, through lack of training, to appreciate and overcome the problems which are daily met in this branch of knowledge. Steps should be immediately taken to encourage graduating mechanical and electrical engineers to take a post-graduate course in subjects related to this branch, such as chemistry, metallography, metallurgy, etc. Students should gather together all available data and take a course at some accredited school. (The Opportunity School is recognized by the North Western Association of Schools and Colleges and the Welding Departments by The Gas Products Association and many manufacturers of welding equipment and supplies.)

The student will find in this search for knowledge that he has entered one of the few uncharted fields, and one which affords unlimited opportunities for research. A welding engineer is today a necessity in every railroad system, shipyard and many industrial plants, yet few engineers with enough welding knowledge to fill these positions are available.

Opportunity School, Denver. First Unit of New Building at Extreme Right. Prof. Odell Attended the School in the Older Building When a Boy.

The training of the designer will have to go hand in hand with that of the engineer and welder, for, as the connecting link between the two, the problems of welding are necessarily his.

Our method of teaching fusion welding describes in detail the theory and practice of every welding process. We tell and show how to weld every weldable metal by each of the following processes—Forge, Oxy-acetylene, Electric Arc, "metal and carbon electrode," Electric resistance, and Thermit; also soldering, brazing, etc., giving detailed instructions for handling such important jobs as boiler welding, sheet metal welding, tank welding, pipe welding, refrigerating machinery, condenser coils, rail joint welding, railroad welding, structural steel welding, cutting, etc.

We show how to prepare parts for welding, how to preheat, how to anneal, how to select welding material.

We explain the meaning of all words and terms found in metallurgical, metallographic, physic, chemical and welding literature.

We tell how to install and care for welding equipment, giving Federal, State and insurance laws, rules and regulations governing the installation and operation.

Our regular lectures consist of practical welding, chemistry, metallurgy, metallography, servicing, salesmanship relating to the welding industry, executive training and instructorship. We use a number of valuable charts and tables of useful information.

Our general lectures are given at the beginning of the school term and thereafter at the beginning of each month to all day and night students. This lecture lays the foundation for good work by making clear that welding is a fusion process, and they are told that the only way to success is by mastering the principles which govern perfect fusion and physical requirements.

The various methods of welding are compared so as to indicate that the fundamental purpose of each is to secure perfect fusion

*Technical Director, Welding Dept., Denver Opportunity School.

of two or more parts. It is also indicated, in a general way, that welding blowpipes, regulators, gages and electric machines are instruments of precision requiring careful handling, and that there are certain common-sense safety principles which must be observed. At this point, too, we find it highly desirable to point out the responsibility resting upon the welder, who is often the only competent judge of his own work until that work is subjected to service. The purpose and scope of our instructions is then carefully explained so each student will understand that he is not expected to become a finished welder "in one term" through this instruction, but only to secure the knowledge and skill required so that he may start in as an apprentice welder without danger of continually making fundamental mistakes.

Auto and Machine Shop Building.

In the shop, each new student or group of students is taken in hand by advanced students for practical training; the purpose of this is to see if the advanced students can impart the knowledge they have obtained to others; it is also part of their training as instructors and supervisors.

The lecture room is very well equipped (with more equipment promised). Our projection and reflecting picture machines are very useful in showing slides, cuts, advertising matter from magazines, catalogs, etc. At the end of the room, facing the class, is a slate blackboard the full width of room, and in the center and above is our screen for pictures which is on rollers to be pulled down over the blackboard. On each side of screen are two demonstrating tables for gas cutting and welding, electric arc cutting and welding, resistance and spot welding. At one side in front is an acetylene generator. The room is 27x33 feet. We also have in our lecture room a collection of welds and metals. Weld specimens are good, bad and indifferent from various shops, firms and industrials. Steels of every composition and in every state are here for explanation of heat-treating, case hardening, scleroscope, Brinell, etching, Rockwell, metallographic, and physical tests. We expect to have in the near future, a finer physical laboratory in connection with our lecture room, the machines to be made in our own machine shops.

Our library has many books and publications on welding, metallurgy, and metallography, is open at all times to students, and books may be taken home by taking out a card.

We have a fully equipped chemical, metallurgical and metallographic laboratory, the only one, we believe, in the United States in any school or college devoted exclusively to the science of welding. Excluding equipment for chemistry and metallurgy, our metallographic equipment consists of Hoskins carbon determination furnaces, Wysor metallographic grinding and polishing machines, balances of all kinds, including quantitative balances. Also microscopes, light projectors, spectroscopes, cameras for photomicrographs, etc.

Our welding laboratory or shops are also well equipped with manifolds for gases, separate tables for cutting, portable outfits, blacksmith forge, electric arc welding machines, furnaces for preheating with charcoal, kerosene preheating torches, large bench shears for sheet metal, heavy cast iron face plates, heavy cast iron cone for forming all sizes of circles, heavy vises, pipe vises, work benches other than welding tables, grinding and brushing wheels and stands, compressed air, very large supply of tips for various makes of blowpipes, cutting and welding, heavy tools of all kinds, etc.

We have an assortment of torches to the number of thirty, and we have to thank several firms for apparatus donated to the school in the interest of welding.

Our shop takes care of all the commercial welding for the Public Schools of the City and County of Denver, including all the manual training shops and the machine shop as well as the automobile shops of this school and much outside work.

Many firms of this city contribute all kinds of scrap material to practice on and even offer to deliver it. This support has been furnished generously by Hendrie & Bolthoff, Mine & Smelter Supply Co., York Products Co., manufacturers of refrigerating apparatus, Western Steel Products Co., manufacturers of heavy boiler plate products; Eaton Tank Co., manufacturers of tanks of all kinds, Burkhardt & Son, manufacturers of structural steel products.

The average enrollment for the past five years has been around three hundred and twenty-five. We have no waiting lists in the welding departments. A student can begin his studies as soon as

A Recent Welding Class.

he enrolls, at any time during the year and devote as much time to it has he can spare, getting what he can from that time, registering again the following term. We can handle sixty (60) men in the shop each week, fifteen (15) each night.

In registering, first come, first enrolled; and as soon as the shop quota is filled, those who were unable to get in the shop can come to lectures four times a week if they choose or take up chemical work two of the four nights. No student can hope to get or stay in the shop unless he attends lectures at least one night each week, because there is a technique to welding arrived at after many years of experiment and research work and we want our students to have a foundation upon which to build future worth.

A lecture room student is advanced to shop in the following manner:

Each student is given a number for the purpose of better checking his attendance as well as the progress he is making and to show no partiality in advancement to the shop. By putting numbers as well as the names to be advanced to the shop on the board, the student is told just how near he is to practical work and all are anxious to get in the shop. Suppose No. 3 decides he does not care for welding after a few days, No. 61 takes his

place. Suppose No. 59's work interferes with his night attendance, No. 62 takes his place. No 32 leaves the city, No. 63 takes his place in the shop, and so on.

Night classes are held from 7:30 P. M. to 9:15 P. M., first four nights of week.

Day classes are held from 9:00 A. M. to 3:00 P. M., one hour for lunch, these classes are held first five days of week.

Laboratory ("chem") work is optional, but is necessary to obtain a degree of welding efficiency engineer or welder of Class A.

The number of day students or students attending day classes average fifteen for the year or term, although at times we have had twenty-five in attendance for weeks at a time.

Lectures for day students are from 9:00 A. M. to 11:00 A. M. Shop work for day students from 11:00 A. M. to 12 noon—one hour for lunch. Shop work again from 1:00 P. M. to 3:00 P. M.; total of five hours. Should crowded conditions exist in the shop during the day, those that do not care to work under these conditions are permitted to go to the library and study.

In the evening, we have many welders who come for lectures only, and many of our day students are ones who work night shifts and come to classes in the morning before going home. Some of them work in the morning and come to classes in the afternoon and to lectures in the evening.

Very often we have at our lectures, men who do not care to weld but are connected directly or indirectly with welding and wish to know something of the fundamental and technical principles concerning the application of fusion welding.

Until last term "1926-1927" we have not been able to confer a degree on account of not having a laboratory. Now we give the degree of Welding Efficiency Engineer, "W.E.E.," but to get that degree it has to be earned with the following:

500 hours school shop work.
300 hours school lectures and Physical Laboratory.
400 hours school Elementary Chemistry, Metallurgy and Metallography.
400 hours school Advanced Chemistry, Metallurgy and Metallography.
900 hours Industrial Training (working as a welder).

2500 hours Total.

The student may have 2500 hours to his credit and not be able to obtain his degree because he did not have the number of hours required in any one subject—Lecture, Shop, Chemistry, Metallurgy, Metallography or Industrial Training. Should the student have the required number of hours in all subjects he can then take his final examination and if he can pass, making a grade of 80 percent, he is given a diploma. A student may accomplish this in the usual time of four years, over a number of years, or he may reduce the actual number of school terms or years by much studying and handing in of essays and papers and by discussions in the lecture room. He is given credits according to the merits of his papers or discussions, but he must have his full nine hundred hours of industrial training. When the student is in industrial training he must make reports as to his progress from time to time, and it is our desire that he work at as many different kinds of welding in different shops as possible in the nine hundred hours or one year.

Should a student be working as a welder before or at the time he enrolls in this school, and can show nine hundred hours actual industrial training, he is considered as having earned those credits and that cuts his time down in obtaining his degree.

We also give certificates as follows:

CLASS "A"

500 hours school shop work.
300 hours school lectures.
400 hours school Elementary Chemistry, Metallurgy and Metallography.
900 hours Industrial Training.

CLASS "B"

500 hours school shop work.
300 hours school lectures.
900 hours Industrial Training.

CLASS "C"

500 hours school shop work.
300 hours school lectures.

We have had a great many students who have gone out in the industrial world and are making good as welders. Many have returned year after year and we expect to give quite a number of "W.E.E." diplomas and Class "A" certificates during the school term of 1927-1928. One student obtained his degree this year as Welding Efficiency Engineer.

Success or failure of any undertaking depends largely on organization, this being especially true in the science and art of welding. What is done in the early stages of welding development will shape its course and either retard or hasten application to industry in general. Therefore it is to the interest of all employes, employers of welders, or those in charge of welding, to co-operate heartily and this applies especially to welders.

Due to lack of trained engineers, supervisors and welders it will rarely be possible to build up the ideal organization desired overnight, but by degrees one handicap after another will be removed. The successful application of welding is based on engineering principles, and therefore, it rests with the trained mind of the engineer (not engineers who have conferred the degree of welding engineer upon themselves), for successful development. An engineer should be placed at the head of every welding organization.

INSPECTION TRIPS PLANNED TO DETROIT INDUSTRIES

Detroit, Mich., July.—During National Metal Week, to be held in Detroit the week of September 19th, four national technical societies will be holding their annual or special meetings, while at the same time the Ninth Annual National Steel and Machine Tool Exposition will be held in Convention Hall, Detroit.

In addition to the largest educational industrial exposition ever held in the United States and the splendid technical programs prepared, the plant inspection program offers an unparalleled opportunity for the visitor to observe the production and manufacturing methods of some of America's largest metal manufacturing and consuming plants.

The program provides for inspection during every afternoon of the week with the exception of Monday and an additional special trip is planned for Friday morning. The schedule of plant inspection is as follows:

Tuesday afternoon, September 20th:

Cadillac Motor Car Co., Dodge Bros., Budd Wheel Co., Detroit Steel Products Co., Detroit Copper and Brass Rolling Mills (succeeded by American Brass Co.).

Wednesday afternoon:

Lincoln Motor Co., Hudson Motor Car Co., General Motors Research Laboratories Detroit Seamless Steel Tubes Co., Victor-Peninsular Co.

Thursday afternoon:

Ford Motor Co.—River Rouge Plant, Chevrolet Motor Co., Barnes-Gibson-Raymond, Inc., Fisher Body Corp., Park Chemical Co.

Friday morning:

Packard Motor Car Co., Ford Motor Co.—Highland Park Plant, Parke-Davis Co., Michigan Malleable Iron Co.

Friday afternoon:

Ford Motor Co. at Fordson, Studebaker Corp., General Motors Proving Grounds, Detroit Edison Co.—Trenton Channel Plant.

FALL MEETING OF A. W. S.

The following is a tentative program of the 1927 fall meeting of the American Welding Society to be held at the Book-Cadillac Hotel, Detroit, September 19-23:

MONDAY, SEPTEMBER 19

MORNING

Registration—Registration facilities will be provided at the Exposition Headquarters all day Monday, commencing at 9:00 a. m., for the men, and at the Book-Cadillac Hotel for the ladies.

A registration fee of $1.00 per person will be charged.

NOON

Luncheon for ladies at Book-Cadillac Hotel.

AFTERNOON

Automobile ride for ladies.

Meeting of Board of Directors, A. W. S.—2:00 p. m. Book-Cadillac Hotel.

EVENING

Meeting of American Bureau of Welding—7:30 p. m. Book-Cadillac Hotel.

TUESDAY, SEPTEMBER 20

MORNING

Technical Session—10:00 a. m. Book-Cadillac Hotel.

1. Airplane Welding, by J. B. Johnson, Chief Material Branch War Department, Air Corps, McCook Field.
2. Welding on the Long Distance Aircraft by Atlantic Aircraft Corporation.

AFTERNOON

Technical Session—2:00 p. m. Book-Cadillac Hotel.

1. Report of San Francisco Section's Investigations on "Study of Welds Subjected to High Temperatures."
2. Heat Treatment by the Oxy-Acetylene Flame, by E. E. Thum, Associate Editor, Iron Age.
3. A Metallurgical Study of Welds, by G. R. Brophy, Research Laboratory, General Electric Company.

Moving Picture Theater Party for Ladies—2:00 p. m.

EVENING

Theater Party—Details will be announced later.

WEDNESDAY, SEPTEMBER 21

MORNING

Technical Session—10:00 a. m. Book Cadillac Hotel.

1. Car Welding, by Victor Willoughby, General Mechanical Engineer, American Car and Foundry Company.
2. Automobile Welding, by W. C. Happ, Chief Engineer, Dept. Methods and Standards, Studebaker Corporation.

It is planned to have a number of automobile concerns discuss this paper.

NOON

Luncheon and Musicale for Ladies at the Detroit Yacht Club.

AFTERNOON

Inspection Tours—2:00 p. m.

Arrangements have been made for inspection tours to the River Rouge Plant of the Ford Motor Company and to the plant of the Fisher Body Corporation.

EVENING

Meeting of Structural Steel Welding Committee—7:30 p. m. Book-Cadillac Hotel.

Carnival Dance with American Society for Steel Treating—Hotel Statler.

THURSDAY, SEPTEMBER 22

MORNING

Technical Session—10:00 a. m. Book-Cadillac Hotel.

1. Production Welding of Water Heater, by H. J. Grow, Air Reduction Sales Company.
2. Welding in the Plant of the Combustion Engineering Corporation, by C. S. Reed, Vice-President and General Manager.

AFTERNOON

Technical Session—2:00 p. m. Book-Cadillac Hotel.

1. Welding of Structural Steel, by Joseph Matte, Jr., of Albert Kahn, Inc.
2. Welding in the Design of Steel Plate Work, by L. J. Sforzini, Engineering and Maintenance Dept., Eastman Kodak Company.

Ladies' Shopping Tour—2:00 p. m.

EVENING

Annual Fall Dinner Dance of the American Welding Society—6:30 p. m. Book-Cadillac Hotel.

EXPOSITION

WELDING AND CUTTING EXPOSITION LARGEST EVER HELD

The Welding and Cutting Exposition held under the auspices of the American Welding Society and in co-operation with the National Steel and Machine Tool Exposition in Detroit the week of September 19th will be the largest exhibit of its kind ever held. A special section of Convention Hall of over 10,000 square feet has been set aside for the welding exhibit. Consequently all of the exhibits will be grouped together and the thousands in attendance will have the opportunity to observe the latest and best equipment and developments in this line. The two previous exhibitions of the A. W. S. at Boston and at Buffalo occupied less than one-half the space that will be devoted to welding at the Detroit show.

INSTRUCTIVE BOOKLET ISSUED BY HAYNES STELLITE COMPANY

"Haynes Stellite in the Oil Fields" is the title of a very interesting and comprehensive 40-page booklet prepared by the Haynes Stellite Company of Kokomo, Indiana. Besides presenting the scientific reasons for the value of Haynes Stellite in the oil industry, the booklet gives the proper procedure for applying the metal to obtain the maximum benefits. The data presented were gathered by a petroleum engineer retained for the purpose of investigating the operating conditions in the oil fields.

On account of the savings in drilling costs effected by facing drills with stellite, this nonferrous metal, which is an alloy of cobalt, chromium, and tungsten, is finding a number of uses in the oil country. For anyone in this or any field demanding unusually heavy duty from cutting tools, this book contains much usable information. It describes the chemical and physical properties of Stellite, presents reports of Stellited bits in practice, aand gives in careful detail, with excellent illustrations, the procedure in applying Stellite to fishtail bits, discs, core barrels, under-reamer cutters, and other tools. Charts and diagrams show the comparative hardness and durability of Stellite as compared with high speed steel at temperatures up to 1800° F., and also under actual working conditions in the oil fields. One diagram gives the number of bits used and number of trips in the hole in drilling two wells, one with steel and one with Stellite, to a depth of 3,600 feet.

This book is interestingly written and illustrated, and the data is carefully prepared. It is worth having for the practical information it contains.

FRENCH ACETYLENISTS ACKNOWLEDGE TRIBUTE TO FOUCHE

Since the dinner of the International Acetylene Association, which was held on June 21, for the purpose of presenting the Morehead medal to Edmond Fouche of Paris and Augustine Davis of New York, letters have been received by the Association from Mr. Fouche acknowledging the gift in terms of sincere appreciation. Mr. Fouche writes that in this presentation he sees a compliment made by American industry to French industry and that this testimonial of esteem and friendship added to so many others intensifies the pleasure felt at receiving this high distinction. Mr. R. Granjon of the Office Centrale de L'Acetylene et de La Soudure Autogene also wrote to express the gratitude felt by that organization for the high honor conferred on their countryman. The letters make special mention of the splendid speech of Mr. E. L. Davis. It is very evident from this correspondence that the cordial relations between the acetylene industry in France and the United States have been still more strengthened by this event.

Oxygen Makers Meet in Montreal

Gas Products Association Summer Convention Points to Applications of Welding Which Are Important to All Industries

THE thirteenth mid-summer meeting of the Gas Products Association, held at the Mt. Royal Hotel, Montreal, Canada, July 13th to 16th, was attended by 21 active members, 23 associate members, 27 guests and 20 ladies. Most of those who came to the meeting took advantage of the convenient train schedules to arrive the day before the formal opening of the convention. This resulted in a good attendance at all of the sessions.

The membership of the Gas Products Association comprises about 50 oxygen manufacturers located in different industrial centers, with associate members representing manufacturers of carbide, acetylene, oxy-acetylene apparatus, and oxy-acetylene welding supplies. The mid-summer meeting is regularly held at a place which is sure to provide plenty of recreation, as well as facilities for getting together for discussion of the technical and commercial problem of the industry, the chief outlet of the oxygen manufacturers being the industries which are large users of the oxy-acetylene welding and cutting process.

At the Station, Shawinigan Falls.

Ready to Display Golfing Skill.

Everybody Happy at the Mount Royal.

In the selection of Montreal for its possibilities in the line of recreation, the Association certainly made no mistake. Both the city itself and the surrounding country are noted for scenic advantages and a great many points of historic interest which give visitors plenty of opportunity for sight-seeing. Golf courses and pleasure resorts of all kinds provide a great variety of entertainment in addition. The members took advantage of the opportunity to stage a snappy golf tournament at the Marlborough Golf Club, where arrangements for their entertainment were made by Mr. V. G. Bartram of the Shawinigan Products Corporation. The prize winners in the tournament were W. C. Harrison, J. T. Butler, L. F. Loutrel, E. D. Findlay, M. L. Goodrich, C. C. Trees, and C. F. Munson.

In preparing its program for the meetings and technical sessions, the Association adopted as its slogan "More Gas Welding and Cutting." The significance of this slogan is reflected in the detailed program which was published in the July issue of THE WELDING ENGINEER.

Technical papers bore directly on the special fields of application of the oxy-acetylene process which offer the greatest possibilities for the development of future markets. One of the most important of these is the subject of "Pipe Welding for Heating Contractors." Professor Dibble's paper pointed out the advantages of welded pipe installations and suggested that steam fitters and heating contractors be prepared to use the process as one of the most important tools of their trade in the future. As an example of what can be done, he gave a description of an all-welded hot water heating installation, which was described in the April issue of THE WELDING ENGINEER, and pointed out the advantages of welding in this particular installation.

Another important application of welding is the substitution of welded steel assemblies for iron castings in making parts of heavy duty machinery. It was pointed out by Mr. Plumley that although a great deal of this work is being done at the present time by the electric arc process there is a tremendous volume of it which can be done by the oxy-acetylene process and even when the electric process is used for welding, the new kind of construction makes necessary the use of the oxy-acetylene cutting torch for a great deal of the steel cutting which is involved.

Two papers which are reproducel in this issue were read by H. H. Mattson and Charles Kandel. The first of these showed that there are new developments in the use of the bronze welding rod which promise faster operation, and the second, while describing a new type of under water cutting torch, gives some interesting information on the value of a steel cutting process which can be adapted to submarine operation.

All of these important applications of welding and cutting were illustrated in the Gas Products Association Film entitled "The Magic Flame." Two reels of this film were shown to the members and there was some interesting discussion of the plans for reproducing a third reel. The purpose of this film is to furnish a means of explaining the oxy-acetylene process to the public.

This is the first time that the Association has had any of its meetings outside of the United States, and several opportunities were afforded to get acquainted with the industry as carried on in Canada. At the opening meeting Mr. A. S. Turnbull, Sales Manager of the Canadian Liquid Air Company, described the development of the oxygen industry in Canada. He pointed out how the development was handicapped by the fact that there are comparatively few industrial areas where sales for oxygen in large quantities can be made, consequently it has been necessary to secure a large number of customers using gas in small quantities. The territory has been covered so thoroughly that welding equipment can be found in operation in the smallest towns in Canada, even in towns of less than 100 population. Mr. Turnbull's company has encouraged this development by establishing welding schools at different centers so that people could learn how to use

"More Gas Welding and Cutting" Is the Slogan of This Group. Practically Every O

the process. A close-up of some of the actual work done in Canada was furnished and an inspection trip of the Angus Shops of the Canadian Pacific Railroad made. At these shops their welders and over 50 cutters are regularly employed, using over 5,000 feet of acetylene and nearly 25,000 feet of oxygen.

One of the most interesting and instructive events on the program was the inspection trip through the principal properties of the Shawinigan Water and Power Company at Shawinigan Falls.

This inspection trip was conducted by Mr. R. A. Witherspoon of Canada Carbide Co., a subsidiary of the Shawinigan Water & Power Co., which is the first largest distributor of electricity in the world. The company controls, in the form of electricity or hydraulic power nearly 600,000 horsepower. This power is supplied by the falls of the St. Maurice river whose water falls over 250 feet in a dozen miles and drains nearly 20,000 square miles of watershed. The first visit made on the special trip was the generator section of power plant No. 2 in which is found one 45,000 horsepower unit the total capacity of this plant being 145,000 horsepower. After visiting this plant and getting a close-up view of this new generating system and the control and recording devices which are maintained with it the party moved on to the falls which provide a beautiful bit of natural scenery. The next plant visited was the Canada Carbide plant where electric power is used to melt coke and limestone together for the production of calcium carbide. Guests had an opportunity to see the huge carbide furnaces tapped, the crushing and sorting processes, and the special machinery used in the fabrication of containers and the preparation of carbide for shipment. A visit to the acetylene generating room furnished a view of the largest acetylene generator in the world. From this generator acetylene is carried through an 8" pipe line to the plant of the Canadian Electro Products Co., which is a large and modern electro-chemical plant for the manufacture of acetic acid and other derivatives of acetylene gas.

Following the inspection trip the guests enjoyed a delightful lunch on the lawn in front of the Cascade Inn as guests of the Shawinigan Products Corporation, then returned by special sleepers to Montreal to make train connections for their respective destinations.

The hospitality extended on the occasion of the inspection trip through Shawinigan Falls was just a part of the program prepared by the Shawinigan folks to make our visitors repaid for their visit to Canada. They took advantage of an open evening in the program to furnish a delightful smoking concert at the Mt. Royal Hotel, made all arrangements for the very successful golf tournament, and also worked out a splendid program of special entertainment and recreation for the ladies of the party so that they were kept busy all of the time. All the guests were enthusiastic in their expression of gratitude for the thoughtfulness of this group.

It was the general sentiment of the convention that gas welding and cutting have proven themselves such indispensable aids to industry as to make sure of splendid opportunities for further applications. Enough good work has already been done to show that these processes are dependable and economical. There are many industries which are not now using the oxy-acetylene torch in any way near the volume that is possible. Definite plans are being made to gather information which will be useful in bringing the process to the attention of these industries in the future.

Following is a list of those who attended:

PRESIDENT

H. B. Pearson, Chicago, Ill.

SECRETARY AND TREASURER

Stuart Plumley, Chicago, Ill.

HONORARY MEMBER

E. G. Luening, Louisville, Ky.

ACTIVE MEMBERS

A. S. Bordeaux, Michigan Ox-Hydric Co., Muskegon, Mich.
Q. P. Brown, Ox-Hydrogen Mfg. Co., Kansas City, Mo.
John T. Butler, Burdett Oxygen & Hydrogen Co., Pittsburgh, Pa.
O. E. Engler, The Balbach Co., Omaha, Nebr.
C. O. Epperson, Compressed Gas Corporation, Denver, Colo.
E. D. Findlay, Acme Oxygen Co., Chicago, Ill.
W. H. Girdler, Kentucky Oxygen-Hydrogen Co., Louisville, Ky.
M. L. Goodrich, Swift & Co., Chicago, Ill.
W. J. Lacey, Burdett Oxygen Co., Oklahoma City, Okla.
W. F. McKay, International Oxygen Co., Newark, Toledo and Verona.
H. J. Mueller, Universal Oxygen Co., Sheboygan, Wis.
E. F. Platt, Portland Oxygen & Hydrogen Co., Portland, Ore.
A. J. Russell, Bettendorf Oxygen-Hydrogen Co., Bettendorf, Iowa.
E. H. Smith, Commercial Gas Co., Minneapolis, Minn.
Horace N. Smith, Memphis Oxygen Co., Memphis, Tenn.
S. H. Smith, Universal Oxygen Co., Milwaukee, Wis.
A. F. Wall, Wall Brothers Co., Detroit, Mich.
W. C. Wall, Wall Brothers Co., Detroit, Mich.

...s of Importance in the Oxy-Acetylene Industry Is Represented in This Picture.

ASSOCIATE MEMBERS

V. G. Bartram, Shawinigan Products Corp., Montreal, Canada.
Henry Booth, Shawinigan Products Corp., New York, N. Y.
J. B. Burdett, Burdett Manufacturing Co., Chicago, Ill.
Lorn Campbell, Jr., Harris-Calorific Co., Cleveland, Ohio.
H. S. Card, The Welding Engineer, Chicago, Ill.
G. O. Carlson, Wm. Wharton Jr. & Co., Easton, Pa.
R. P. Dieckelman, Pressed Steel Tank Co., Milwaukee, Wis.
D. C. Duncan, American Carbolite Sales Co., Duluth, Minn.
Irwin F. Fausek, Modern Engineering Co., St. Louis, Mo.
John J. Flaherty, Page Steel & Wire Co., Bridgeport, Conn.
W. D. Flannery, K-G Welding & Cutting Co., New York, N. Y.
E. J. Flood, Page Steel & Wire Co., Chicago, Ill.
Chas. L. Gulick, Wm. Wharton Jr. & Co., New York, N. Y.
Joseph Halla, National Gauge & Equipment Co., Chicago, Ill.
A. F. Jenkins, Alexander Milburn Co., Baltimore, Md.
J. J. Kelly, Shawinigan Products Corp., New York, N. Y.
W. F. Kuhl, Shawinigan Products Corp., New York, N. Y.
W. J. Kyle, Page Steel & Wire Co., Bridgeport, Conn.
L. F. Loutrel, Shawinigan Products Corp., New York, N. Y.
A. MacMillan, Shawinigan Products Corp., Montreal, Canada.
W. C. Swift, American Brass Co., Waterbury, Conn.
F. N. Williams, Federal Carbide Co., Anniston, Ala.
R. A. Witherspoon, Canada Carbide Co., Shawinigan Falls, Canada.

VISITORS

E. C. Ackerman, National Carbide Co., Milwaukee, Wis.
Harry S. Ashmun, Self Propelling Nozzle Co., New York, N. Y.
F. S. Austin, Carbo Oxygen Co., Pittsburgh, Pa.
R. R. Browning, Linde Air Products Corp., New York, N. Y.
F. A. Bureau, Canada Liquid Air Co., Montreal, Canada.
J. H. Delorme, Anaconda American Brass, Ltd., Montreal, Canada.
Prof. S. E. Dibble, Carnegie Institute of Technology, Pittsburgh, Pa.
F. R. Fetherston, Compressed Gas Manufacturers' Association, New York, N. Y.
Wm. C. Harrison, Linde Air Products Corp., New York, N. Y.
L. A. Hull, National Carbide Co., New York, N. Y.
Charles Kandel, Craftsweld Equipment Co., New York, N. Y.
W. C. Keeley, Jr., National Carbide Co., New York, N. Y.
S. B. Kirk, Air Reduction Co., Chicago, Ill.
B. N. Law, Air Reduction Co., Chicago, Ill.
Geo. Lindsay, Union Carbide Co., Chicago, Ill.
Harold M. Mattson, Lincoln Steel Co., Chicago, Ill.
C. S. Munson, Air Reduction Co., New York, N. Y.
B. B. Pearse, Atlas Foundry Co., Cleveland, Ohio.
Dr. Ernest Poulin, Acting Mayor, Montreal, Canada.
E. M. Sexton, Air Reduction Co., New York, N. Y.
George R. Strate, National Carbide Co., Keokuk, Iowa.
J. D. Swain, Union Carbide Sales Co., New York, N. Y.
R. G. K. Tothill, National Carbide Co., New York, N. Y.
C. C. Trees, Carbo-Oxygen Co., Pittsburgh, Pa.
A. S Turnbull, Canada Liquid Air Co., Ltd., Montreal, Canada.
G. B. Walker, Linde Air Products Corp., New York, N. Y.
R. P. Winberg, Mueller Brass Co., Port Huron, Mich.

LADIES

Miss E. Bordeaux, Chicago, Ill.
Mrs. Q. P. Brown, Kansas City, Mo.
Mrs. H. S. Card, Chicago, Ill.
Mrs. C. O. Epperson, Denver, Colo.
Mrs. E. D. Findlay, Chicago, Ill.
Mrs. E. D. Flood, Chicago, Ill.
Mrs. A. F. Jenkins, Baltimore, Md.
Mrs. J. J. Kelly, Shawinigan Falls, Canada.
Mrs. A. MacMillan, Montreal, Canada.
Mrs. W. F. McKay, Newark, N. J.
Mrs. H. J. Mueller, Sheboygan, Wis.
Mrs. E. F. Platt, Portland, Ore.
Mrs. Stuart Plumley, Winnetka, Ill.
Miss Marcia M. Rogan, Oak, Park, Ill.
Mrs. E. H. Smith, Minneapolis, Minn.
Mrs. Horace N. Smith, Memphis, Tenn.
Mrs. S. H. Smith, Milwaukee, Wis.
Miss Grace Teagan, Detroit, Mich.
Mrs. C. C. Trees, Pittsburgh, Pa.

At the final session of the meeting at the Mt. Royal Hotel the following board of directors was elected:

Messrs. W. L. Brant, O. E. Engler, C. O. Epperson, M. L. Goodrich, W. F. McKay, H. B. Pearson, A. Roy Robson, W. A. Sherman, E. H. Smith, W. F. Vercamp, S. D. Winger.

A meeting of this board was called on August 2nd, at which time the following officers were elected:

President, C. O. Epperson; first vice-president, O. E. Engler; second vice-president, E. H. Smith; secretary and treasurer, Stuart Plumley.

The board also elected the following executive committee:

Messrs. C. O. Epperson, O. E. Engler, E. H. Smith. H. B. Pearson, M. L. Goodrich.

A report of the convention would not be complete without mention of the general spirit of hospitality and friendliness which was encountered everywhere in Montreal. The people themselves showed plainly enough that courtesy to visitors has become a habit. The local newspapers showed keen interest in the proceedings of the convention and had reporters on hand at all of the open sessions to get first-hand information, which was published in good volume in the principal dailies of Montreal. After the convention was over the Shawinigan Falls Review printed an interesting story of the visit to Shawinigan Falls, winding up with a courteous invitation to come again.

Arc Welding of Stellite

Great Savings Are Shown in Cement Mills Where Grinding Rings Are Reclaimed at Low Cost and Long Shutdowns Averted

By C. M. Rusk*

WE ARE all more or less familiar with Stellite as a machine tool for cutting and also know of the success obtained by welding with the oxy-acetylene flame. But it is comparatively new with the electric arc process. This process is gaining momentum in the cement field, the heart of which is in the vicinity of Allentown, Pa.

There is much to gain in facing all heavy abrasive parts with Stellite by the electric arc process.

It reduces the number of shut-downs.

Drag Chain Shaft.

Reclaimed parts give about five to thirty times more length of service and after that can be salvaged again.

Reclamation costs are very small compared to new parts cost.

Plant maintenance is lowered.

Some of the applications are building up rings for cement mills, wearing plates on roll crushers, screw conveyor flights and budgeon, rider block for drag chain, drag chain shafts, pulverizer plow arms, hammers on hammer mills, and dipper teeth on shovels.

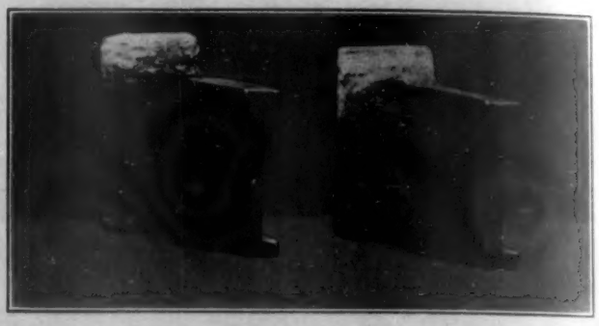
The rings for grinding in cement mills probably show the

Rider Block for Drag Chain.

greatest savings. The life of a new steel ring is about 400 hours. The grinding efficiency for this period is as follows:

100%	Efficient	for	280 hours
85%	Efficient	for	60 hours
50%	Efficient	for	60 hours

R. D. Thomas Co., Philadelphia.



Reclaimed Pulverizer Pow Arm.

They generally renew at 85 per cent efficiency. One of these rings stellited has been operating for 3,200 hours at 100 per cent efficiency and still going strong.

The direct savings here is shut-down and man hours. Each shut-down requires six hours to take out and replace new rings taking five men to perform the operation.

Assuming shut-down loss at	$300.00
Labor for 30 men hours at $ .60 per hour	18.00
Total	$318.00

At the present number of hours running for the stellite ring, it represents 8 shut downs or a total of $2,544.00. This is at 400 hours life. If based on a life of 320 hours or at the 85 per cent grinding efficiency point, then there would be 9½ shut downs in a 3,200 hour period. This is an additional 1½ shut down. Costing $318.00 per shut down or $477.00 or total of $3,021.00.

The cost of reclaiming one of these rings with Stellite using the electric arc process:

200 lbs. of Stellite at $4.00 (base price)	$8.00.00
22 hours labor welding operator at $ .70	15.40
Cost of power at .02KWH	2.80
Total	$818.20
Savings	$2,202.80

The best equipment suited for this class of work is in the author's opinion, the Constant Potential Motor Generator Sets with as many outlet panels as operators required to perform this work. This equipment is made in 300, 500, 750, 1,000 ampere capacity and they are rated at about 10 to 25 per cent overload for welding duty with a 5/16 inch diameter electrode 14 inches long. The power required to fuse 5/16 inch diameter Stellite electrodes is between 250 and 300 amperes at 20 volt arc.

Stellite being a ternary metal of chrominum, cobalt and tungsten it is in the non-ferrous metal class and this requires reverse polarity with direct current welders; i. e. welding lead positive and ground lead negative.

In non-ferrous metal welding the arc is more stable and easier to manipulate with outlet panels such as used with Constant Potential Motor Generator Sets than is the single operator welding set that we are more familiar with.

One other desirable feature is constant current value and this can now be obtained by using the new edgewound alloy resistance outlet panel which has just recently been placed on the market.

In depositing non-ferrous metals like Stellite wo do not have the smooth flowing arc stream that is characteristic of mild carbon steel welding. The metal goes through the arc in large

globules and seems to flatten itself out on the parent metal. It is this characteristic that makes the equipment outlined above so satisfactory for this class of welding.

The operator in manipulating the arc in metallic arc welding of Stellite will get better results by making a small weave weld than he will with the plain bead weld. Weaving is a movement making a half-circle. Beading is holding the electrode motionless and moving the hand forward.

The elecrtode should be held at about a thirty degree angle with the arc crater as in ordinary mild steel welding. A short arc should be maintained.

We do not see the same deep penetrating of the arc in Stellite welding as we see in making mild steel weld. This point must be carefully watched by the operator as it is much easier to miss good fusion in Stellite welding than it is in mild carbon steel welding.

Coefficient of Expansion (1.deg. C.)	0.000,016,5	0.000,014,5
Hardness Scleroscope	20	74
Rockwell	C. 10	C. 50-55
Brinell	150	480-530
Resistance to wear	1 (Hard wearing carbon steel)	5
Heat Conductivity	11.5 (Silver 100)	1.5
Magnetic Properties	12 (Silver 100) Can be Magnetized	1.5 Cannot be magnetized
Coefficient of Friction		Dry surface as good as steel lubricated.

Suction Type Dredging Cutter for River Harbor Work.

Stellited Dipper Teeth.

Stellite while in a molten state in the arc deposit differs from steel as its appearance sometimes resembles a gummy substance blown up from inside.

The following will give some idea of the comparison of Stellite to mild steel:

	Mild Steel	Stellite
Weight	0.278 cu. in.	0.311 cu. in.
Specific Gravity	7.70	8.54
Tensile Strength	55,000	38,000
Elastic Limit	29,000	38,000
Elongation	30%	0.05%
Reduction Area	60%	Too small to detect
Melting Point	(2,498° F.) 1,370° C.	(2,336° F.) 1,280° C.

Side View of Dredging Cutter.

The melting point and coefficient of expansion are very near the same. This reduces cracking of Stellite surface to the minimum.

Stellite thoroughly amalgamates with steel.

Steel is slightly stronger and more ductile and this gives a tougher base combined with a hard wearing surface of Stellite.

Stellite withstands the action of heat. It is equally hard at a bright red temperature as when it is cold. It also resists chemical corrosion.

While the two photographs of suction type dredging cutters do not apply to the cement industry, they are interesting, as this kind of equipment, together with centrifugal, pumps, receives the hardest kind of wear in harbor dredging work.

Note—The Bethlehem Foundry & Machine Co., of Bethlehem, Pa., who are using the above type of equipment satisfactory, have furnished the cement industry a considerable number of these rings and rolls stellited.—Editor.

FIRST NATIONAL FUELS MEETING

A meeting of exceptional importance to American Engineers and to the general public has been arranged by the Fuels Division of the American Society of Mechanical Engineers. This meeting, which is being sponsored by many technical and trade organizations, will be held at St. Louis on October 10-11-12-13.

Millions of tons of fuels are being consumed annually with little thought concerning their scientific application and conservation. Considering the cost of these fuels, the damage to property and the menace to health caused by imperfect combustion, it is obvious and needs no arguent, that some action should be taken to improve the present methods of using these great natural resources. It is for that specific reason that the Fuels Division of the A. S. M. E. was established.

Gas Welded Fuselage Construction

Strong Joints Obtained With Oxy-Acetylene Torch Act as a Protection to Passengers When Engine Trouble Develops

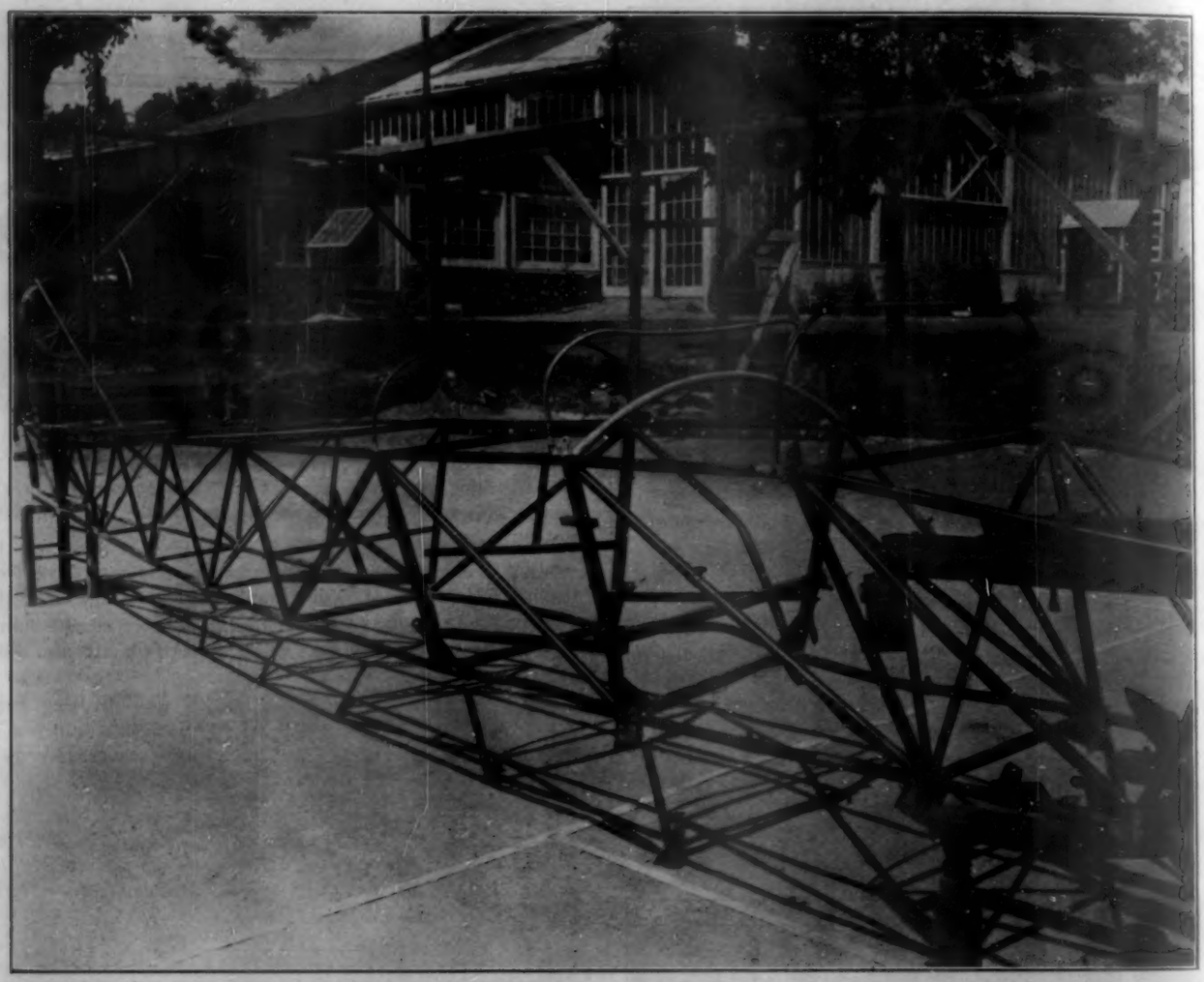
By N. Damours*

PILOTS who fly over the rock strewn hills of North Dakota, known as the Bad Lands, are dependent upon the flying qualities and construction of their planes and the efficiency of their motors to save themselves and their passengers from the clutching fingers of this rough country.

Recently a new production light commercial plane, the Alexander Eaglerock, piloted by Burt Bowelle, of the previously mentioned state, was forced to make a landing in a very bad stretch of country, due to water in the gas supply. Bowelle, an experienced pilot, estimates that his plane was traveling at its minimum speed of 35 miles per hour, when he was forced to side slip into a boulder strewn canyon, landing upon the two wings on the right side of the ship. None of the three occupants of the plane were hurt in the least, although the wings were badly broken and the canvas covered fuselage torn in many places.

The broken parts were removed from the plane and the ship in its entirety was crated and sent to the factory in Denver. The engineering force carefully uncovered every part of the plane. The motor was found to be undamaged. It sat on an oak bed in the fuselage of the Eaglerock. The oak bed was securely bolted to the welded tube steel fuselage. The fuselage itself was the least damaged of any part of the ship.

The picture of the fuselage tells the story of how well the welding withstood the terrific shock of such a speedy landing on such a piece of ground. Had the fuselage been of wooden construction, it would undoubtedly have resulted in fatal injuries to one or all of the ship's passengers.



Passengers in This Wrecked Plane Were Undoubtedly Saved by the Strength of the Oxy-Acetylene Welded Joints.

The Alexander Aircraft Company in its production of an airplane with a high factor of safety, recognize the necessity for highly skilled and specially trained operatives for airplane welding, as the average welder, accustomed to the type of work found in railroad shops, garages, etc., is entirely unfitted to undertake the class of welding which is found in airplane fuselage construction. It has been the experience of the company that it is much more preferable to train a young man who shows apti-

Welding Supt., Alexander Aircraft Co., Denver, Colo.

tude but has had little or no previous experience, than to try to alter the habits of an experienced welder trained to an entirely different class of work. They have found that most of the objections to gas welding as applied to airplane construction expressed by many in the past, has been due to the use of presumably expert welders who were in fact unprepared to do that class of welding.

Low carbon and chrome molybdenum seamless tubing varying from .028 to .065 in. wall thickness is used in the fuselage construction; and in order to obtain a high factor of safety it is imperative that the welder obtain a perfect fusion with a minimum of oxidation, for with such thin material a very little carelessness or inexpert workmanship will seriously impair the strength of the structure.

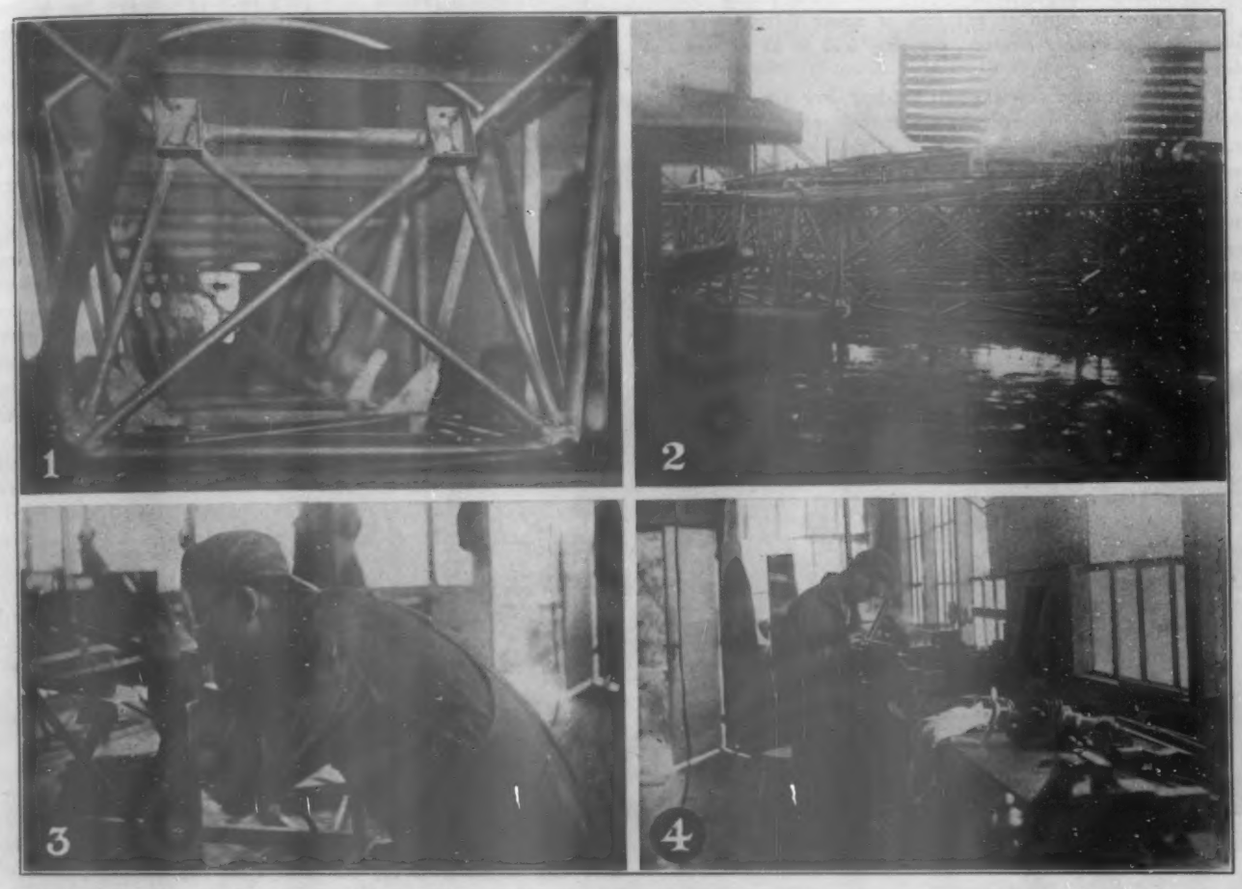
In order to get the proper results only the best grades of welding wire of the proper size should be used. The company found it best to use only the standard products of those manufacturers who guarantee their product and stamp their name on each piece of wire. They have found that 1/16 and 3/32 inch welding wire meets nearly all of their requirements.

The equipment is very important, and the best is none too good for airplane welding. Some difficulty has been experienced in obtaining torches to meet all requirements. The inaccessibility and constantly changing angle of the welds in the case of many of the fuselage joints create a condition which can only be met with a very light torch and a light flexible hose which will not be a drag on the operator, tiring him in performing welds which must often be executed from very awkward positions.

Welded fuselage is a feature of the airplane mentioned. The company has need of men who understand the value and making of the welded joint and offer opportunity to such men to join their sales organization as sub-dealers and representatives. The fact that airplanes are rapidly mounting the crest of international popularity is an indication that connections so formed at this time will be well worth while.

A good weld depends to a great extent upon the knowledge of the welder. As the art of fusion welding develops, competition forces those who practice it to know more and more concerning what are beginning to be recognized as the complex phenomena involved.

Welding development is proceeding so rapidly that the leader of yesterday often finds himself buried today. Welders have rated themselves and been rated by the number of years they have practiced the art. It is more to the point now to rate them by how up to date they are in the art and that is why we prefer welders trained at the Opportunity School, in Denver. They keep



1. Front Motor Bullhead, welded. 2. Fuselages All Welded, Ready to Assemble. 3. Welding Front Motor Bullhead. 4. Welding Rear Interplane Struts.

Late Model Eaglerock Plane.

abreast of the times and are familiar with the language of physics, chemistry, metallurgy, metallography, etc., and can read and discuss understandingly technical articles dealing with welding development.

TORCH FOR UNDERWATER CUTTING*

By Charles Kandel
Craftsweld Equipment Corporation.

In September, 1925, the U. S. S. S-51 sank to the bottom of the ocean at a depth of 135 feet of water following a collision with a passenger steamer, carrying with it 34 officers and enlisted men.

The heaviest marine derricks and the best deep sea divers were rushed to the scene immediately and heroic efforts were made to raise the sunken vessel, but without success. After a thorough investigation the conclusion was reached that only a well organized and fully equipped major expedition could handle the project with any chance of success. The facilities of the best equipped private salvage company were investigated and found inadequate for the task. The Navy Department then set to work to organize and prepare for the work in hand, entrusting the task to Lieutenant Commander Ellsberg of the Brooklyn Navy Yard,

Diver Ready to Go Down With Torch.

a graduate of Annapolis with sixteen years' experience in the Navy.

The success of Commander Ellsberg in handling the project is a matter of record. The three indispensable aids which made it possible were the following:

1—Experienced and fearless deep sea divers familiar with the construction and layout of the S-51.

2—Gigantic pontoons, each capable of lifting 80 tons, which could be lowered and placed in position with accuracy and facility, a type of equipment hitherto unknown.

3—Underwater cutting equipment which could be depended upon to cut metal at great depth speedily and effectively, also previously unknown.

In preparation for the work the best Navy divers were assembled and trained on the U. S. S. S-50, a sister ship of the S-51. Every known type of underwater cutting equipment was tried and laid aside as ineffective, and a new type was designed and built for the purpose.

Six different kinds of fuel gases were tried and all abandoned in favor of pure hydrogen, contrary to all previous theories on the subject based entirely upon B. T. U. values.

Several different makes of standard cutting torches were adapted for underwater cutting with more or less success, only to be found unsatisfactory in deep water, the usual causes being a tendency to backfire readily, inability to penetrate multiple layers of corroded metal, or a certain unhandiness of construction making it impossible to reach into corners or cut readily along irregular surfaces.

The special features of the torch developed by Commander Ellsberg are the following:

(a) Freedom from backfire—attained by mixing the gases in the tip, and by the use of a single seat contact between the tip and the torch head firmly secured by a screw joint.

(b) Maximum preheat with pure hydrogen, a fuel gas of low calorific value. Acetylene was abandoned early because of its unstable nature under water pressure and its unsafe properties at pressures over 15 pounds. Mixed fuel gases were tried and found unsatisfactory because of a tendency to freeze under pressures required in deep water, and because of the explosive qualities of the by-product gases under conditions of imperfect combustion.

(c) Penetration through rust and scale of one or more layers of metal.

(d) An air pocket to displace the water around the end of the tip and yet not cause the air to interfere with the preheating flame or reduce the purity of the oxygen cutting jet. This proved the most difficult task of all, and its practical solution constitutes one of the most advantageous features of the Ellsberg Torch.

(e) Convenience in operation, such as ease of control of gases and compressed air, and freedom in reaching into tight corners and cutting along irregular surfaces, attained only after laborious experiments under actual working conditions in deep water.

(f) Compact spacer, to enable the operator to apply the torch to the surface of the metal to be cut under conditions of very poor visibility prevailing under water, with assurance that maximum preheat was being developed and maintained for continuous cutting.

The steps by which these features were attained were very slow and laborious, and frequently fraught with serious hazard in the course of testing in deep water.

The expedition, fully equipped, began its operations off Block Island in April, 1926, and on July 7th delivered the U. S. S. S-51 at the Brooklyn Navy Yard, having overcome all the conceivable handicaps of bad weather, unexpected developments, and innumerable hazards. The official report classifies the Ellsberg Underwater Cutting Torch as one of the "indispensable aids" in the success of the work.

As a result of the inquiries for this torch, Commander Ellsberg has placed it in the hands of Craftsweld Equipment Corporation of New York. The final product now embodies all the essential features of the original design.

Paper read before Gas Products Association Convention, Montreal, July 15, 1927.

JOHN A. TOLEIK ACCEPTS POSITION WITH GIBB WELDING MACHINES CO.

Mr. John A. Toleik has severed a 17-year connection with the American Can Company to accept the position of Chief Engineer of the Gibb Welding Machines Company, Bay City, Michigan.

Mr. Toleik has been in charge of all welding developments with the American Can Company and was personally responsible for the high production turned out in their many welding operations.

Mr. Toleik's chief interest with the Gibb Welding Machines Company will be in the further development of their Research Department.

HOLDERS OF A. C. WELDING PATENTS COMBINE INTERESTS

Announcement has been received that the Holslag patents and the Arendt patents covering the use of alternating current for arc welding have been combined by an exchange of licenses between C. J. Holslag, the owner of the Holslag patent, and F. C. Owen, the owner of the Arendt patent. Now that the rights under these patents have been cross-licensed arrangements have been made to issue joint licenses under both patents to other manufactures of alternating current electric arc welding equipment.

Safe, Economical Storage for Fuel Oils

Welded Rectangular Tanks of Over 100,000 Gallons Capacity Solve the Storage Problem at Low Construction Cost

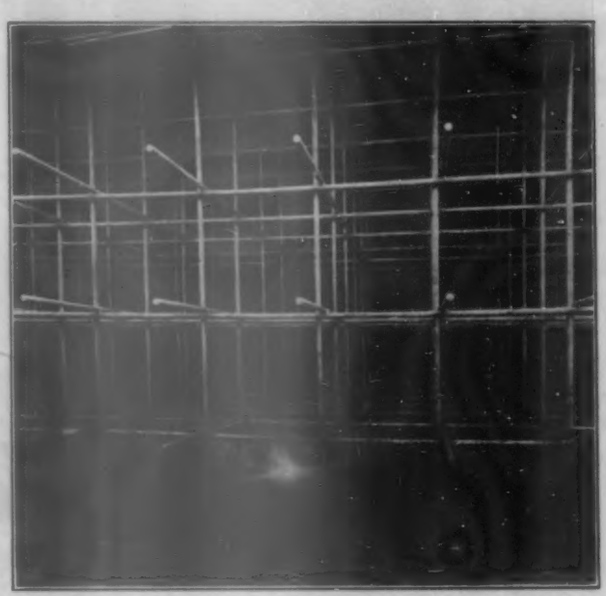
By T. E. De Pew*

THE problem of providing safe, economical and adequate storage facilities for volatile oils, particularly gasoline and fuel oils, within the limits of our large cities, is one that is constantly becoming more important and more difficult of solution. Not only is gasoline consumption increasing at a very rapid rate, but recently fuel oil has gained steadily in use as a substitute for coal in the heating of office buildings, hotels and apartment houses. Economy naturally prohibits the use of barrels for storing this vast amount of oil, and the cylindrical tanks commonly employed elsewhere satisfactorily, do not here, in many instances, represent the ultimate in economy, convenience and adaptability.

Welding has been employed to solve the problem of most economically storing these huge supplies of oil within city limits, rectangular pressure tanks having been welded which satisfactorily provide adequate storage facilities not only for millions of gallons of gasoline in large tanks, but also provide individual storage tank facilities for the fuel oil used in the heating of various structures.

Approximately two and one-half million gallons of gasoline will be stored in the twenty-four rectangular pressure tanks, each of more than 100,000 gallons capacity, constructed for one of the very largest oil companies by the S. O. S. Welding Company, Brooklyn, New York, under the supervision of Mr. J. Kjekstad, Manager, who invented this method of tank construction. A number of these tanks, and the method of their construction, are shown in accompanying illustrations.

Ten of the 24 Rectangular Pressure Tanks, and Men Composing One of the Three Shifts. Above is Welded Crane.



View of Interior of Tank.

Eastern Manager, The Welding Engineer

Storage tanks of this same type, of smaller capacity, have given efficient service in fuel oil storage in such important structures as the Federal Reserve Bank and the hotels Waldorf-Astoria and Vanderbilt, as well as a number of other buildings in the vicinity of New York City.

The New York Fire Department requires that tanks used for the storage of volatile oils within the Metropolitan area shall be subjected to a test pressure of from 25 to 30 lbs. hydrostatic pressure, and shall be encased in concrete approximately 12 inches thick.

Where the storage of considerable gallonage is involved, the following items figure very importantly in storage cost: Cost of the tanks, property space occupied by tanks, cost of the concrete necessary for their enclosure.

Pressure tanks of the type here described offer considerable savings in the amount of space occupied because of their rectangular design. Furthermore, the amount of concrete required for encasing is considerably less and the installation of the concrete is simplified, thereby reducing labor cost per cubic yard. Under certain conditions, a saving of 50 percent may result from the installation of rectangular tanks in place of cylindrical tanks.

Further saving results from use of pressure tanks, due to the reduction to a minimum of evaporation, the use of pressure preventing excessive losses.

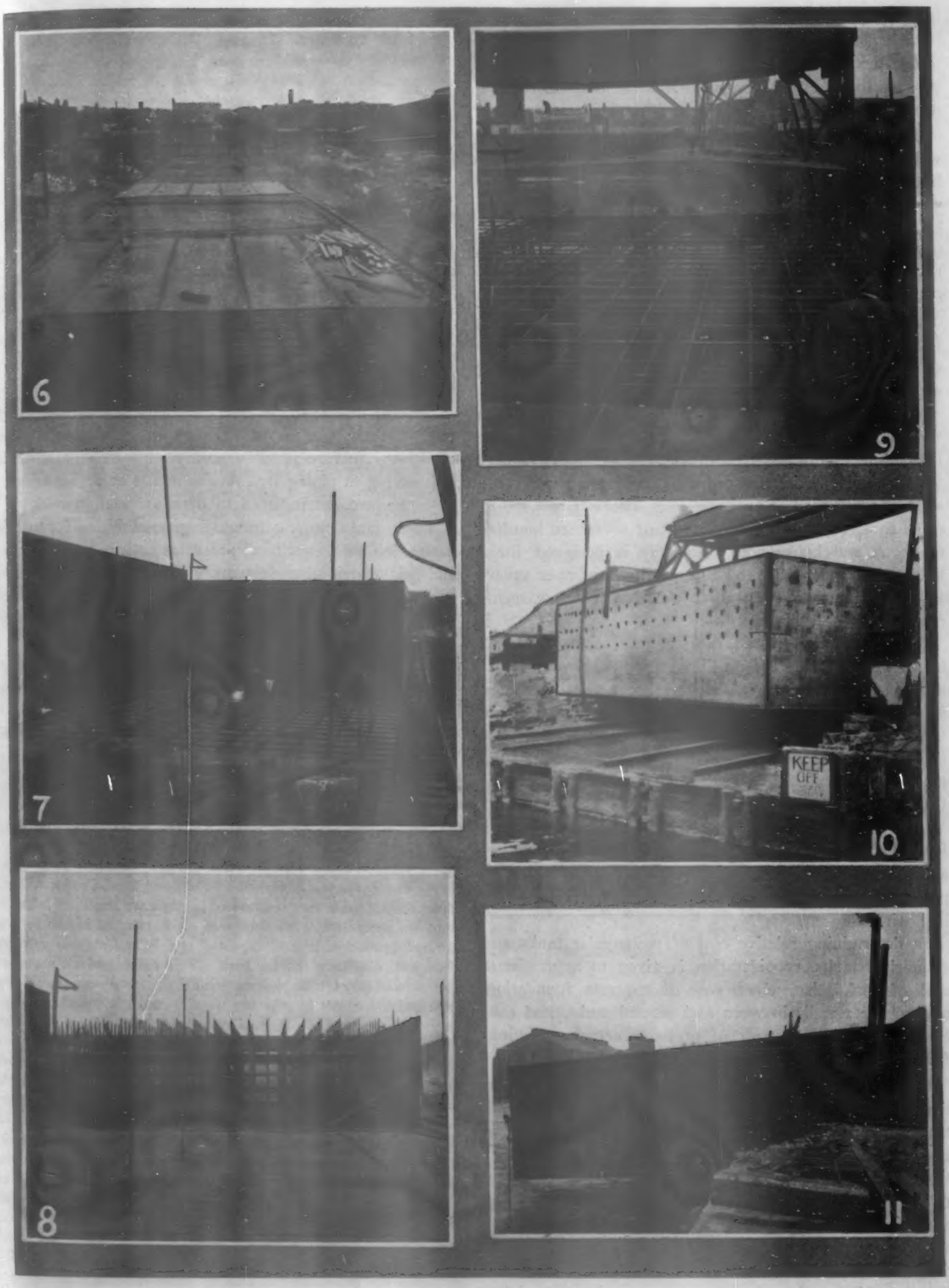
Tank with Three Side and Top Plates Attached.

Welding End of Stayrod, to the Upper Tank Plant.

Completed Tank Afloat, Ready to Be Towed Away to Destination.

Where tank storage is to be provided for fuel oil in apartment houses, hotels and office buildings, etc., the rectangular design enables utilization of the maximum capacity of the space available..

One of the most important advantageous features of this type of tank is the flat roof surface, formed by one or any number of these tanks. Because of the internal bracing, the tank roof has a tremendous carrying capac-



(6) After Several Bottom Tank Plates Have Been Laid Out, and Internal Structure of One Partly Fabricated. (7) Beginning the Erection of the Internal Structure, by Welding Vertical Rods to Bottom. (8) Tank Skeleton with but One Side Plate Attached. (9) Welded Crane Lowering Top Plate into Position. (10) Showing Tank Suspended by Crane, Ready for Lowering on Launching Ways. (11) Launching the First Rectangular Pressure Tank.

ity and can be utilized in the open as a space for storage, or as a floor for a building built on top of the tank or tanks, using the latter as a foundation. This makes it possible to permit of storage of fuel oil, etc., where ordinarily the limited space would prohibit any storage.

The tanks here pictured are 37x37x10 ft. high, each weighing approximately sixty tons, with a little over one hundred thousand gallons net capacity. They are constructed of ⅜ in. plate throughout, with inside angle irons in all corners. All seams are lap welded. The internal bracing consists of round bar stayrods in two horizontal and one vertical direction equally spaced. The ends of the stayrods are arc welded to the inside of the tank plates and tacked to each other where crossing, this forming an extremely rigid structure capable of withstanding severe abuse in transportation and handling without the slightest danger of springing leaks.

The carrying capacity of these tanks, calculated on the basis of and in accordance with the building code regulations, is twenty-five hundred pounds per square foot, live load. In other words, one of these tanks will support a live load of approximately 37x37 ft. x 2,500 lb. equal to 3,422,500 lb., or in excess of seventeen hundred tons. A warehouse floor ordinarily is designed for a live load of from three to six hundred pounds per square foot, or less than twenty-five percent of the carrying capacity of these tanks.

The crane here pictured, is a welded structure designed by the S. O. S. Welding Corporation. It easily picks up one of these sixty ton tanks, almost 250 percent of its normal capacity and carries it down the tracks, about 600 ft. to the water, where the tanks are launched into the harbor, then towed to their destination, hauled from the water and placed on their foundations, all ready for the storage of gasoline.

The power plant supplying the current consists of a Knudsen Diesel engine, which drives the welding generators, from which electric current is distributed to all points of the job through about 500 ft. of permanently laid wire.

In determining relative cost of rectangular tanks and cylindrical tanks, consideration is given to approximate cost of tanks themselves, cost of concrete foundation, and concrete walls between and around tanks, and concrete fire walls, also cost of property actually required for the tanks.

On this basis for the purpose of arriving at comparative costs, the following charges are calculated for rectangular and cylindrical tanks of the same capacity for a small installation:

Cylindrical Tanks—12 tanks, 11 ft. 0 in., 60 ft. x 0 in., ⅜ in. shell and ⅜ in. heads, including manhead and fittings. Weight approx. 39,000 lbs., each $2,200		$ 26,400
Erection, $200 each		2,400
Concrete: Foundation, 13,530 sq. ft. at $1	$13,530	
Walls, 9,600 sq. ft. at $1.50	14,400	
Firewall 6,000 sq. ft. at $2.00	12,000	39,930
Property, 15,980 sq. ft. at $2.00		31,960
		$100,630
Rectangular tanks (S. O. S. Welding Corporation design), 4 tanks, 41 ft. 6 in. x 41 ft. 6 in., ⅜ in. shell, 1⅛ in. strayrods on 24 in. centers, including manhead and fittings. Weight approx. 120,000 lb. each, total		$ 33,000
Concrete: Foundation, 9,245 sq. ft. at $1.00	$ 9,245	
Walls, 51,110 sq. ft. at $1.00	5,110	
Firewall, 4,200 sq. ft. at $2.00	8,400	22,755
Property, 10,000 sq. ft. at $2.00		20,000
		$ 75,755

Several direct and indirect savings accruing through use of rectangular tanks, such as that where warehouse or other structure is to be built on top of storage tank, also saving in piping that results in use of lesser number of tanks, are not included in these calculations.

These tanks possess interesting possibilities for use in connection with equalizing pressures both in water supply and gas distributing systems. Use of unsightly water towers could be abandoned, these pressure tanks, placed below ground, replacing them. Also, casinghead gasoline, which evaporates with especial rapidity, can be much better conserved by storage under pressure in these tanks.

Thirty welders were employed in this work. In amount of welding wire consumed, welding equipment employed, and man hours required for welding, this contract represents one of the largest single operations ever performed by use of arc welding.

A NEW METHOD OF BRONZE WELDING*

By H. M. Mattson†

Six years ago, the Lincoln Steel Company was an organization acting as jobbers for Armco Sheet Steel and Steel Products. Our close contact with sheet metal working plants began to bring us inquiries about Armco welding wire which resulted in our making an arrangement with the Page Steel and Wire Company to carry their rods also on a jobbing basis. This move made it necessary for us to employ a trained demonstrator to give service on welding wire and it was not long before we discovered it would be necessary for us to carry a line of coated wire as well as bare wire in order to meet the competition of other distributors, many of whom made an important specialty of a complete line of wire and supplies for welding. We finally made an arrangement to purchase the capital stock and assets of the Koro Electric Corporation. This organization had specialized in the manufacture of welding wire for electric welding which was a unique product in the welding wire market. The Koro wire was identified by the manufacturing process which pressed into the wire a series of knurls. This treatment gave the wire the appearance somewhat similar to a string of flat beads. After the knurling process the wire was coated with a special flux.

Our success with the Koro flux coated steel wire led us to investigate the possibility of coating Tobin Bronze welding wire

**From a paper read before the Gas Products Association Convention, Montreal, July, 1927.*

†President, Lincoln Steel Company.

in the same manner. We have been working on this development in our laboratory for over a year and it was about two months ago that we decided that we had a product which was ready for the market. As far as experimental data is concerned, we have not been able to accumulate a great volume of it on the latest type of rod, but a number of large industrial plants are using it in good volume and running tests on it which we believe will furnish us with some excellent data in the very near future. There have already been enough successful applications of this method of bronze welding to show distinct savings in operating costs, which we attribute to two principal factors. First, the fact that the rod processed in this manner melts more rapidly, and second that it consumes very much less of the flux. Incidentally, it is an advantage to the quality of a bronze welding job to restrict the amount of flux used because very much of a surplus is quite liable to be emphatically harmful.

It is evident enough from this brief outline of the story of Koro Tobin bronze that the only difference between the new method of bronze welding and previous methods lies in the use of a rod which has been processed in this manner, dispensing entirely with the use of the flux can, there being no change in design of the joint or the amount of metal deposited or other mechanical factors that enter into the complete procedure for a particular job.

The physical difference made in the rod by the knurling process is very important to the success which we have had in effecting economies. The visible effect is to change a round, smooth surface into one which is broken up by a great many small sharp corners and projections. When the welding flame is brought to the rod, these small projections serve as conductors of the heat to the body of the rod. It is this that gives us our increased speed because we have a more rapid melting. A secondary result, of course, is the use of less heat or, in terms of the operating costs, the use of less gas.

In applying the flux to the rod, we force the most of it into the knurls. In this manner we keep it in place until it is ready to act on the weld and assure a uniform supply of just the right proportion of the flux, which by the way, we have found it necessary to develop according to our own formula. The fact that this flux has to stay in place and also be exposed to the atmosphere made it necessary for us to create a flux of our own which would meet these requirements.

Following are some of the advantages which we have been able to note in the shops of customers who are already welding bronze by this method.

It is essential in bronze welding to avoid the use of too much heat. The bronze does not stick as well when it is overheated and is not as strong when it cools. One place where overheating is apt to occur is in holding the flame on the weld while dipping filler rod on the flux. By applying the flux directly to the welding rod in sufficient quantity to take care of the amount of metal contained in the rod most of the danger of overheating is eliminated.

Every good bronze welder is careful to add new welding rod when heating up bronze that has been deposited with the torch. If the weld cools while dipping flux, this means adding more welding rod. The coated rod saves this time also.

Bronze has a low melting point compared to steel and iron and it also flows rather freely when it is melted. Every interruption of the work disturbs the uniformity of the deposit. The idea of putting the flux on the rod is to make it possible for the welding operation to proceed without interruption just as long as the wire lasts. It is easier for the welder to acquire a uniform and easy technique when he can continue the operation for longer periods.

There are distinct savings of more than one sort accomplished by making the weld in a continuous way. The actual welding time is shortened, the torch is not kept burning unnecessarily, there is less welding rod used, and less fluxes used. In other words, every factor which enters into the cost of a bronze welding job is influenced by the use of the welding rod that carries its own flux.

There is an advantage in using a bronze rod which is known to be dependable and uniform. If the rod itself can be tested to be uniform throughout, then the welder can use the same technique day in and day out and be sure of the result that he will get.

When a uniform rod is supplied with a uniform flux applied in just the right proportions the dependability of standardized procedure is still further increased. The flux stays in the rod down to the last notch.

Many fluxes will deteriorate when exposed to the atmosphere for any length of time. That is one way in which flux is wasted. In other cases a lot of it is wasted just by being spilled through careless handling. When a flux coated rod is used just enough of the flux is present to do the work.

These advantages are particularly desirable when bronze welding is used in production work. The welder who is using the bronze rod day in and day out gets increased production as a result of every item that helps to standardize operations. Just as soon as he masters the technique of the coated rod he is able to apply it more smoothly and more rapidly than ever before. There is a minimum of waste in time and material.

The bronze rod which we use is the genuine Tobin bronze manufactured by the American Brass Company and finished by the Koro process in our own plant. We are using Tobin bronze exclusively because we are familiar with its quality and believe that this quality is absolutely uniform.

STOODY COMPANY ISSUES NEW CATALOGUE

The Stoody Company, Whittier, California, have just issued a new thirty-two page catalogue, replete with pictures and descriptions of their entire line of welding rod, alloy steels and equipment.

The Stoody Company were pioneers in the oil fields with a hard facing metal, Stoodite, and have now added welding rod and alloy steels for every purpose. They also manufacture and sell welders' equipment for both the electric and acetylene welder.

Copies of their new catalogue may be had by addressing the Stoody Company at Whittier or either of their direct branches, 732 East 12th Street, Oakland, Calif., or 220 East Brady Street, Tulsa, Oklahoma.

NEW HIGH SPEED PORTABLE GRINDER

The Rotor Air Tool Company has purchased the Pneumatic Tool Division of The Warner & Swasey Company, well known manufacturers of turret lathes in Cleveland, Ohio, and will exhibit at the Steel Treaters Exhibition the full line of pneumatic tools and the new Spade Handle Heavy Duty Drills.

They will also exhibit a New High Production Model D-1 Grinder, operating at a working speed of 5,500 and designed to take full advantage of the rapid cutting action of rubber bonded, Redmanol, Bakelite and shellac bonded wheels.

Machines will be operated under practical conditions and special attention will be given to the grinding and finishing of welds.

"A BIT OF HISTORY IN THE OXY-ACETYLENE INDUSTRY"

The Air Reduction Sales Co. has sketched interestingly the history of torch and generator development in a little folder they have just issued, which begins with an account of the presentation of the Morehead Medal to Augustine Davis of New York, and Edmond Fouche of Paris.

To Mr. Fouche is credited the invention of the oxy-acetylene welding torch. In February, 1904, he sent to Eugene Bournonville in New York one of these torches, with which Mr. Bournonville welded a broken machine section which was afterwards used for many years. Mr. Bournonville, who had been an associate of Mr. Fouche in France, in 1901 made the first installation in the United States of a plant for compressing acetylene.

NEW UNA WELDING ROD

The Una Welding and Bonding Company, Cleveland, Ohio, have just put on the market a new electrode, designated as No. 700. The electrode is intended for building up dipper lips, frogs, switches, crossovers, wobblers, shovel points, rock crusher jaws and other hard wearing surfaces, particularly high manganese steel. It is flux coated and is said to weld easily, making a deposit that will not crack, check or peel.

FUME AND SMOKE MASK FOR WELDERS

Willson Goggles, Inc., are circularizing with a series of envelope enclosures describing some of the leaders in their line of protective devices. One of these is a Fume and Smoke Mask which is designed to provide comfort and protection when working in irritating breathing conditions. This mask should be especially useful to welders in working on galvanized iron or in brazing.

HANDLES COMPLETE G-E LINE

The American Steel Engineering Company, 10 South 18th St., Philadelphia, Pa., and 601 Granite Bldg., Pittsburgh, Pa., have ready for distribution a new circular describing, in detail, the line of General Electric welding accessories, including welding helmets and hand shields, welding cable, electrode holders, etc., whch they handle in addition to G. E. electrodes, types A. B and F, and G. E. arc welders.

NEW PREHEATER BURNS KEROSENE

H. H. Kress, 1718 Sansom Street, Philadelphia, Pa., have just issued Bulletin No. 32, describing their new patented vaporizing hand pump kerosene burner, particularly adapted for use in welding.

A distinctive feature is the vaporizing nozzle, which is especially designed for vaporizing the cheaper grades of distillate and furnace oils now generally available.

Construction of this new burner is such that no preheating coils are required. The combustion chamber consists of ruggedly constructed seamless steel shell with an adjustable air shutter, and self-cleaning vaporizing plug. This burner may be operated on any size or make of hand pump tank.

Kress Oil Burner.

Oil can be fed to the burner at 20 to 60 pounds pressure. Because of the shape and design of the nozzle the oil flame produced by this burner is very similar to the cone produced in a properly adjusted welding flame.

H. H. Kress specializes in portable fuel oil equipment for all industrial purposes, including special preheating ovens and portable preheaters operating with compressed air, steam or low pressure fanblast, and is the successor to the business and owner of the patents of the former manufacturers of McKneat Oil Burning Equipment.

ODD PORTABLE WELDER

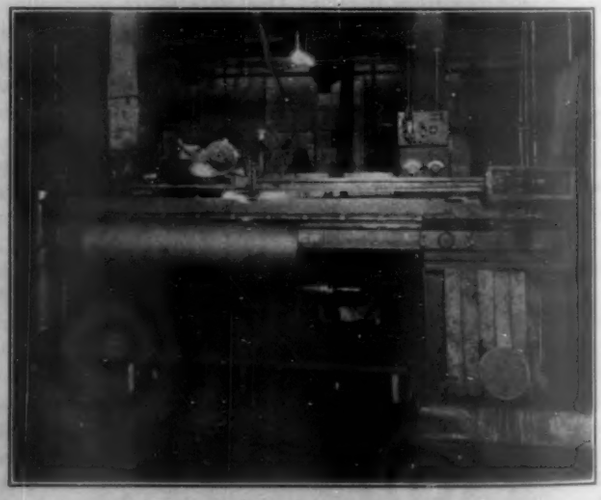
The problem of moving an electric welding equipment from place to place with a minimum of trouble was recently solved in a novel manner by the Tampa Electric Railway of Tampa, Florida. A General Electric Welding Outfit was being used by the track department of that railway and, although it could be loaded on a small flat car and pushed along the rails, this method of moving was impractical, largely because of the difficulty of moving the 3,000-pound outfit out of the right-of-way.

Rear End of Truck Made Into Trailer.

Finally the rear end of a discarded Republic truck was made to fit the base of the electric welder. Coil or helical springs were inserted between the frame and the axle to help the semi-elliptic springs to carry the load. A tongue of 5-inch channel iron was fastened to one end of the improvised trailer, allowing it to be attached to the company's truck. New 33-inch by 5-inch tires were purchased and a coat of gray paint finished the job. The electric welder now goes anywhere with but little effort.

AUTOMATIC CARBON ARC WELDER FOR RANGE BOILERS

Recent announcements of new equipment placed on the market by The Lincoln Electric Company of Cleveland, Ohio, include description of Automatic Carbon Arc Welders for welding range boilers. The accompanying illustration shows one of these new Automatic Welders in actual operation, in a customer's plant.



Lincoln Range Boiler Welder.

On 14-gauge steel the Automatic Carbon Arc Welder is said to make a speed of 150 feet per hour at a cost of slightly over 1c per foot of longitudinal seam. The cost per foot on the head

seams is somewhat less than on the side seams. The side seam is welded with a filler rod which is laid on the seam and fused into the joint by the carbon arc. The range boiler is slipped on to the mandrel of the machine and the top clamps lowered to hold the seam in position. Water cooled copper guards confine the arc to the seam. The clamps also carry the upper rail on which is mounted the carriage for the automatic welding head. The operator merely starts the arc in operation and the motor driven head is carried along the seam, fusing the filler and the edges of the seam together.

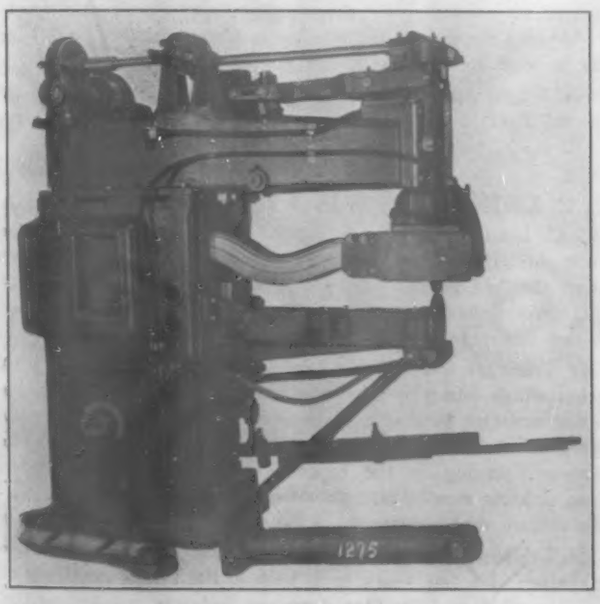
While the above described equipment is built primarily for the completely welded range boiler, it is also adapted to the welding of the riveted and welded range boilers. In this type of construction the rivets are spaced rather widely and the weld is applied to the lap for pressure tightness.

NEW THOMSON DOUBLE ROLLER SEAM WELDER

Thomson Electric Welding Company's No. 375 Double Roller Seam Welder is said to be a rugged and versatile machine, designed for long life, simplicity of operation, and continuous production. All bearing surfaces are carefully proportioned and principal shaft bearings are bushed with bronze. Accessible Alemite lubrication throughout.

The capacity is two pieces of 2 gauge to ⅛ in. iron or steel, depending on length of seam and type of weld desired. The transformer secondary is of cast copper and water cooled, as are also the welding horns, which are 24 inches in length, with two lower horns, one for longitudinal and one for circular seams. Special horns for both seams can be furnished if required.

The rollers are made of hard rolled copper, mounted on water cooled shaft, and easily removed for dressing or replacement. Upper roller is mounted in head which can be turned at right



New Thomson Resistance Seam Welder

angles for use when making either longitudinal or circular seams.

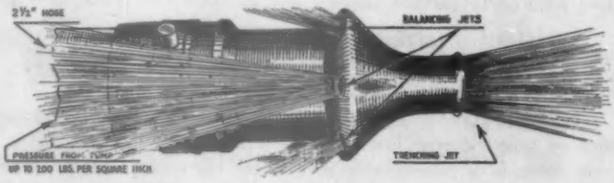
Drive may be either by belt or by ½ H. P.—1200 R. P. M. motor through gear reduction unit and change gears which give linear welding speeds of 6, 9, 12 and 15 feet per minute. Pressure is obtained through a foot treadle and adjustable spring controlling vertical movement of upper roller. The maximum pressure on the roller is 1,500 pounds. The foot treadle is adjustable for length and upon being depressed automatically locks rollers in welding position. At completion of weld another depression of treadle releases head carrying upper roller, allowing it to return to open position.

This machine will be demonstrated at the Detroit show.

NEW UNDER WATER EXCAVATING NOZZLE

The Self Propelling Nozzle Co. of New York have recently announced to the welding trade the Vevac Nozzle, designed to operate under water in the removal of mud, clay, sand and gravel from vessels, pipe line, piers, bridge foundations, and for all other similar under water clearing operations.

The ordinary nozzle for use under water is very difficult to manage when used with a pressure high enough to remove dirt of any kind easily. The Vevac Nozzle, however, is designed to operate at pressures as high as 200 pounds and to prevent recoil when used under such high pressures as the hose will stand. A new feature of this nozzle is the rearward jet arrangement which effects the removal of the dislodged dirt away from the

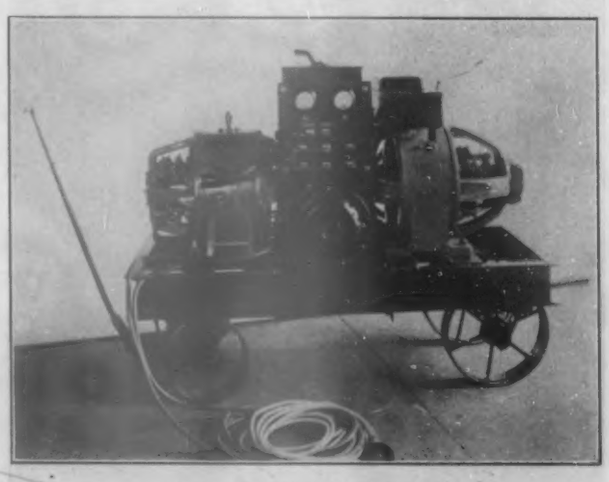


Under Water Excavating Nozzle

line of cut and makes the operation continuous. The back pressure is eliminated entirely, so that the operator can handle it with one hand, while the nozzle itself has a tendency to push forward into the work. This nozzle can be put to good use by the oxy-acetylene under-water cutter in clearing dirt away from the line of cut. It can also be used successfully in cleaning carbide sludge and other accumulations from pipe lines.

WILSON MOTOR-DRIVEN WELDER DELIVERS OVER WIDE RANGE

Several distinctive features are claimed for the new Model 253-W Wilson "Plastic-Arc" Welding Machine. It is designed especially for use in production and repair welding in foundries, steel mills, locomotive and car shops, boiler and tank building, and general machine shops. It has a range of 50 to 400 amperes. The generator is self-excited and no ballast resistance of any kind is used under normal welding conditions (150 to 400 amperes).



Wilson 253-W Arc Welder.

For amperages below 150, a shunt field booster resistance is used in circuit. All regulation of current is accomplished by turning knob of field rheostat. No separate exciter or brush shifting is used to accomplish this regulation.

It is claimed that the arc is easy to start and easy to maintain on account of the properly proportioned reactance which automatically steadies the arc under all welding conditions.

The generator has been so designed as to give full load of 400 amperes when hand welding with metallic arc and the current will not rise over 10% above that on short circuit, thereby reducing

liability of electrode sticking to work when striking the arc.

The manufacturers state that the machine is capable of turning out fast work with metallic electrodes up to ⅛" diameter and with carbon electrodes for welding and cutting up to ¼" diameter.

The machine is driven by a standard 15 H. P. motor, furnished for any commercial voltage, phase or frequency. The generator is of special design, Wilson Type ball bearing. All high tension wires are in a flexible steel conduit. On the ebonite control panel are mounted a 500-ampere ammeter, and 80-volt voltmeter, a rheostat with a single knob for controlling the welding current from 50 to 400 amperes, a reverse polarity switch, and a secondary switch for throwing the shunt field booster resistance in circuit when welding below 150 amperes.

NEW MACHINE FACILITATES PIPE LINE SALVAGE

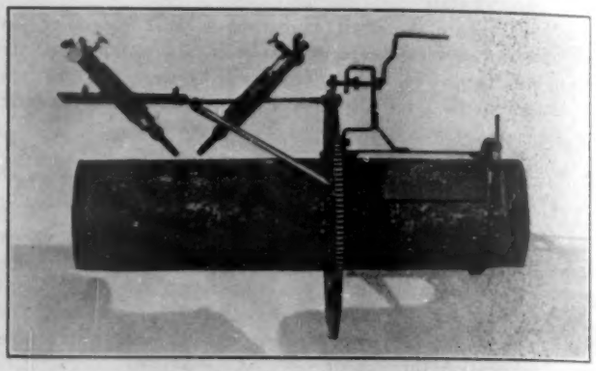
Every year it becomes necessary to discard or relocate many miles of existing pipe lines, especially in the oil and gas fields. Since there is a considerable investment represented in the pipe the question of salvage is important. The quickest method of realizing on this investment must be considered, and also the method which will retain the greatest value in the used pipe.

This Pipe Cutter is Easy to Carry About.

A pipe cutting machine has recently been devised and patented by N. E. Wagner, Welding Superintendent of the Prairie Pipe Line Company, Tulsa, Oklahoma, which greatly facilitates the salvage of such pipe.

To be entirely practicable such a machine must be light, so it can readily be carried from cut to cut along the line. It should also be adaptable to several sizes of pipe. It should be compact, to reduce the amount of bell-hole digging. It should be simple in construction, yet rugged, to work satisfactorily under all conditions of service, and should perform the work at a cost favorably comparable to other methods.

Essentially the Wagner pipe cutting machine consists of two gears and a framework so arranged that two Oxweld oxy-acetylene cutting blowpipes are carried around the circumference of the pipe during the operation. The construction is extremely simple and is clearly shown in the illustrations. When the crank



Wagner Pipe Cutter Set Up on Pipe.

handle is turned the action of the gears causes the carriage supporting the two blowpipes to revolve about the pipe.

The blowpipes may be adjusted to any angle of cut desired, although 45 degrees is usual. Distance between the cuts may be varied within reasonable limits. Special Oxweld cutting blowpipes used provide a compact unit which eliminates much extra bell-hole digging. By using different sized internal shoes, the machine may be employed on different sizes of pipe. Thus a machine may be used on 4-inch, 6-inch and 8-inch pipe merely by changing the internal shoe. Another machine of a larger size may be used on 10-inch, 12-inch and 14-inch pipe.

The Wagner pipe cutting machine is now being marketed by Oxweld Acetylene Company, 30 East 42nd Street, New York, N. Y.

C. C. LEININGER WITH HARRIS CALORIFIC

C. C. Leininger, who for a good many years was with the Linde Air Products Company, and who is very well known among the "old guard," has now become general sales agent for the Harris Calorific Company, Cleveland, Ohio, having assumed his new duties July 1, 1927.

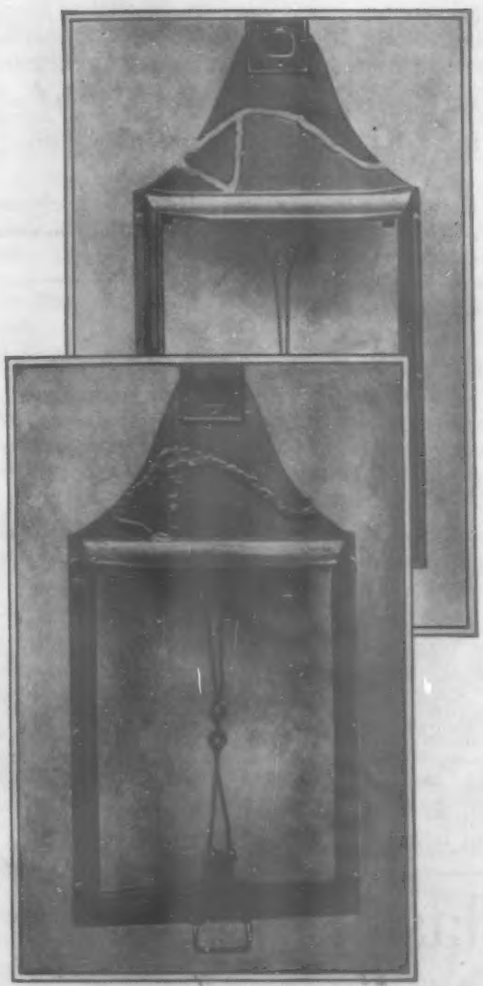
Mr. Leininger was with the Linde Company from 1914 to 1919, during which latter year he was transferred to New York, becoming assistant general sales manager. In 1921 he was transferred to the Storage Battery Division of the Prest-O-Lite Company, serving in the capacity of general sales manager. Some eighteen months later he resigned and embarked on a business venture of his own.

Mr. Leininger, apparently, heard the call. In any event, after an absence of a few years, he is back in the fold, enthusiastic as to the possibility of the Oxy-Acetylene Industry and feeling that the application thereof has not by any means been exhausted.

AIR REDUCTION ACQUIRES U. G. I. GAS BUSINESS

Air Reduction Company, Inc., 342 Madison avenue, New York, has purchased the business, insofar as the manufacture and sale of oxygen, acetylene, and kindred products are concerned, of the United Gas Improvement Contracting Company, a subsidiary of the United Gas Improvement Company, and the United Oxygen Company, Philadelphia. The purchase includes oxygen plants at Philadelphia, Chester, Milton, Enola, and Reading, Pa., and an acetylene plant at Bridgeport, Pa. Thus, the Air Reduction Sales

Welding a thin Casting very difficult to pre-heat



Broken cast-iron scale platform welded with Tobin Bronze without pre-heating

THE danger of cracking and warping prohibited the use of methods involving preheating for the welding of this unsupported cast iron scale platform. By using Tobin Bronze Welding Rods, it was possible to make the repair without pre-heating in a furnace. The low welding temperature required for Tobin Bronze Welding also eliminated the danger of further cracking and reduced the risk of distortion and shrinkage.

Since Tobin Bronze has a tensile strength twice that of cast iron, welds correctly made with this material will not break at the joint. Tobin Bronze permeates the iron and forms a permanent bond stronger than the casting.

Many manufacturers who have proved the value of Tobin Bronze Welding for repair work are now using it to save time and money in manufacturing operations.

Tobin Bronze Welding Rods are made solely by The American Brass Company and each rod has the Tobin Bronze trade-mark rolled in the metal. They may be obtained from leading distributors of welding equipment and supplies.

THE AMERICAN BRASS COMPANY
GENERAL OFFICES: WATERBURY, CONNECTICUT
Offices and Agencies in Principal Cities
Canadian Mill: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

TOBIN BRONZE
Reg. U. S. Pat. Off.
WELDING RODS

EXCLUSIVELY AN ANACONDA PRODUCT

Company, the sales organization of Air Reduction Company, Inc., has acquired through this purchase the production and distribution facilities of five additional oxygen plants and one acetylene plant in the industrial district of Eastern Pennsylvania. The company now operates thirty-four oxygen plants and nineteen acetylene plants, all located in or near principal industrial centers of the United States.

REBUILT WELDER SERVICE.

The Goodman Electric Machinery Company of Newark, N. J., have a host of friends who have taken advantage of their rebuilt welder service. Not only does this company furnish rebuilt welding machines, but they rent electric welding machinery and do repair work as well.

One particularly valuable service to customers is that the Goodman Electric Machinery Co. will take in old welders as part payment on a new or rebuilt machine, and this company is always on the market to purchase outright welding machines that the customer wishes to dispose of.

A concrete case of this service happened recently when a manufacturer moved his plant from one town to another and had to change the 12 welding machines he had on account of change of power. The Goodman Electric Machinery Co. purchased the 12 old machines and furnished new ones which were suitable for the power supply at the new plant.

WILL SHOW WELDING MOVIES AT DETROIT

The Chicago Steel & Wire Company, Chicago, Illinois, is devoting considerable energy right now to the preparations for the Detroit show next month. This company has reserved not only a booth but also a lecture hall which will seat about 150 people. In this booth will be shown slow motion movies of the action of the electric arc and the oxy-acetylene welding operation, and in addition the welding operations as they are carried on in the lecture hall will be projected on the screen. The metallic arc will be enlarged so that it covers an 8 foot square screen. Several new interesting products will be shown in the booth. Among them is a new electrode holder which has been in the course of development for several months. The popularity of surfaced electrodes is growing so that special attention has to be given to the construction of an electrode holder which will insure a good contact and prevent overheating of the electrode. Several new electrodes will also be exhibited. Among them, one which lays down a self-hardening tooled steel deposit on mild steel or other similar backing, another a special flux coated speed rod which is said to melt twice as fast as the ordinary bare electrode, and another electrode which makes an extremely ductile deposit.

NEWS OF THE WELDING TRADE

The Lincoln Electric Company, of Cleveland, follows its annual custom this year of shutting down the plant and sales offices for a vacation period from August 8th to August 20th. During this period only a skeleton organization is maintained in the general offices at Cleveland to handle emergency spare parts orders for shipment from stock.

F. B. Toombs, general sales manager of the Chicago Steel and Wire Company, spent the month of July in Rocky Mountain National Park, Colorado. He purchased a new Hudson car for the trip. He reported having an excellent time and claims to have climbed every mountain that offered enough traction for an automobile wheel.

E. C. Bain, research metallurgist of the Union Carbide and Carbon Laboratories, Inc., Long Island City, New York, is making a tour of European countries and visiting metallurgical plants on the Continent this summer.

Owing to the increased demand for training in arc welding, the Cleveland Welding School has recently installed a new Lincoln stable arc welder.

Edgar R. Chinberg, distributor of U. S. L. arc welders and Hollup electrodes and supplies in San Francisco, Calif., announce the appointment of the Meyer Machinery Company, 1939 Santa Fe Avenue, Los Angeles, California, as their Southern California distributors for the both lines.

The Lincoln Electric Company announces that the Missouri district office has been moved from 1808 Railway Exchange Building, St. Louis, to 1003 Davidson Building, Kansas City, Mr. Robert Notvest being in charge. The St. Louis district will be handled by Mr. Notvest, his time being divided between the two cities. A branch office has also been established at 220 Nicholas Building, Toledo, Ohio, Mr. A. H. Homringhaus, formerly in charge of the Missouri district having been transferred to Toledo in charge of the district.

Mr. J. R. Sproat has recently been appointed superintendent of Wm. B. Scaife & Sons Company, Pittsburgh, whose factory is located in Oakmont, a suburb of the city. Mr. Sproat succeeds the late Mr. G. A. Meckel whose death occurred several months ago.

L. F. Collins, assistant general sales manager, Chicago Steel and Wire Company, leaves this month for a European tour, which will enable him to make some observations on the progress of welding in Italy, Switzerland and France, although this trip is primarily a vacation trip.

It is reported that M. Keith Dunham, W. H. Girdler and E. G. Luening have incorporated the Pipe Bending Process Company at Louisville, Ky., with $20,000 capital.

The Arthur Wagner Company, 701 Washington Boulevard, Chicago, Illinois, has recently been appointed distributors for U. S. L. electric arc welders. Sales representative of this company for the arc welders is Mr. R. E. Mason.

The location of the General Welding Company, San Antonio, Texas, is at 516 Water Street, that city. The manager of the concern is Mr. Fred Grell.

Classified Ads

Help Wanted—75c per line, minimum 4 lines.
Jobs Wanted—4 lines free.
Other Ads—$1.00 per line, minimum 4 lines.
Counted 8 words to line. Add 6 words for keyed address

Position Wanted—By man with mature knowledge of the practical aspects of welding engineering. Many years' experience in welding and in business. Very broad experience in service work. Employed at present but seeking more satisfactory connection. Will give further details, including the finest of recommendations to those properly interested. Address 126, care The Welding Engineer.

Wanted—The address of every gas and electric welder in the United States. Send them to Knight Brothers, 113 S. Oakley St., Chicago, Ill.

For Sale—Service rights on W. K. and W. C. Prest-O-Lite Cylinders, large or small quantities. Alfred E. Corp., 40 Mathewson St., Providence, R. I.

Welder's Little Labor Saver — The Wodack

There are many uses for the WODACK Portable Electric Grinder in the welding shop. And its efficient performance over a great range of work makes it an excellent investment for any shop. "Electric Tool Facts" will tell you why the WODACK is the tool you want. Send for your copy now.

Wodack Electric Tool Corporation

4627 W. HURON ST. CHICAGO, ILL.

American Steel Engineering Company
10 So. 18 St., Philadelphia
601 Granite Bldg., Pittsburgh

GE Arc Welders, GE Electrodes: TYPES A, B and F
GE Welding Accessories: Handshields, Helmets, Electrode Holders, Cable, etc.
Page-Armco Welding Wire and Electrodes
Write to nearest office for descriptive circular and prices

For Sale—Style E Purox cutting torch; No. 20 Purox welding torch, tips 2, 3, 6, 8, 10, 12. No. 2 oxygen regulator, for cutting purposes. No. 2 acetylene regulator, for cutting purposes. 25 ft. ¼-in. 5-ply red hose and 25 ft. ¼-in. 5-ply black hose. Cylinder wrench. Outfit in good condition. Used six months. Cost $156.50 new. Ralph Linger, 3222 W. Jackson, Chicago.

For Sale—One Norwalk 10¼x12 for stage compressor, 5000 pounds per square inch. Good condition. $7,500.00. One oil trap, $30.00. Caustic cylinders, $25.00. Also quantity of copper tubing. Box 331, Coraopolis, Pa.

For Sale—Zeus oil cooled A. C. welder, good operating shape, complete, $200.00. Lincoln 300 ampere welder, 220-3-60 power supply rebuilt, complete, $600.00. Box 122, care The Welding Engineer.

For Sale—Multiple welding unit motor 440 v., 3-h., 60 cy.; Generator, 6 arc, 175 amp., with regulator, main panel, 5 welding panels. No reasonable offer refused. Box 683, Cleveland, Ohio.

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Every machine guaranteed.
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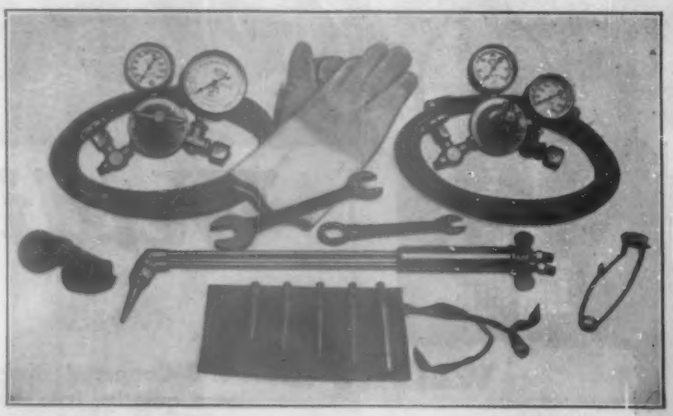

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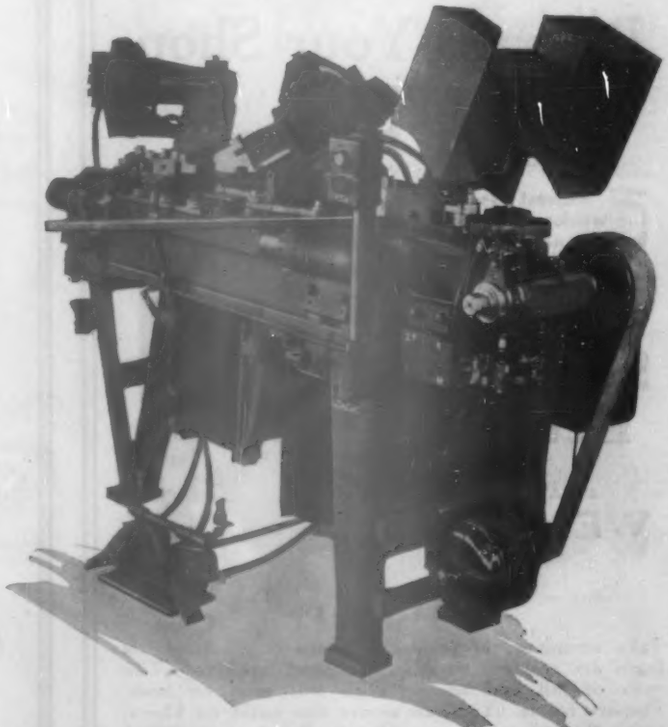

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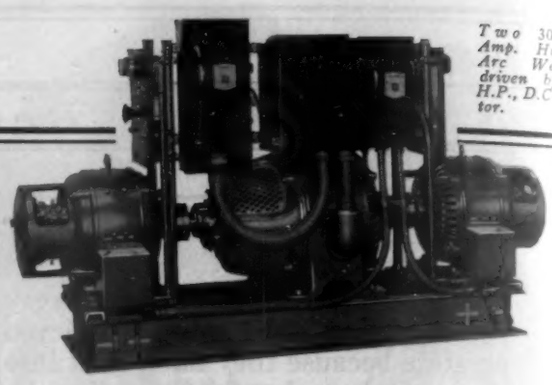

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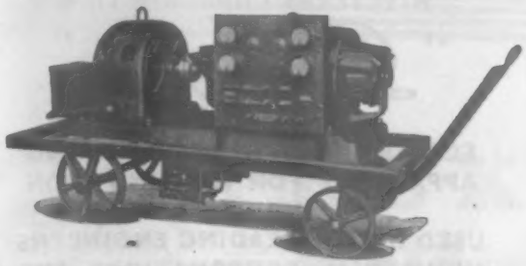

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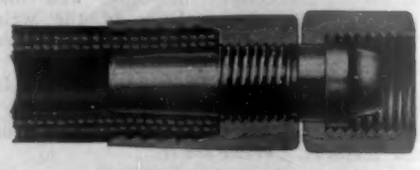

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BOOTH 153A

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Wire to heavy metal	300 welds	12,000 welds
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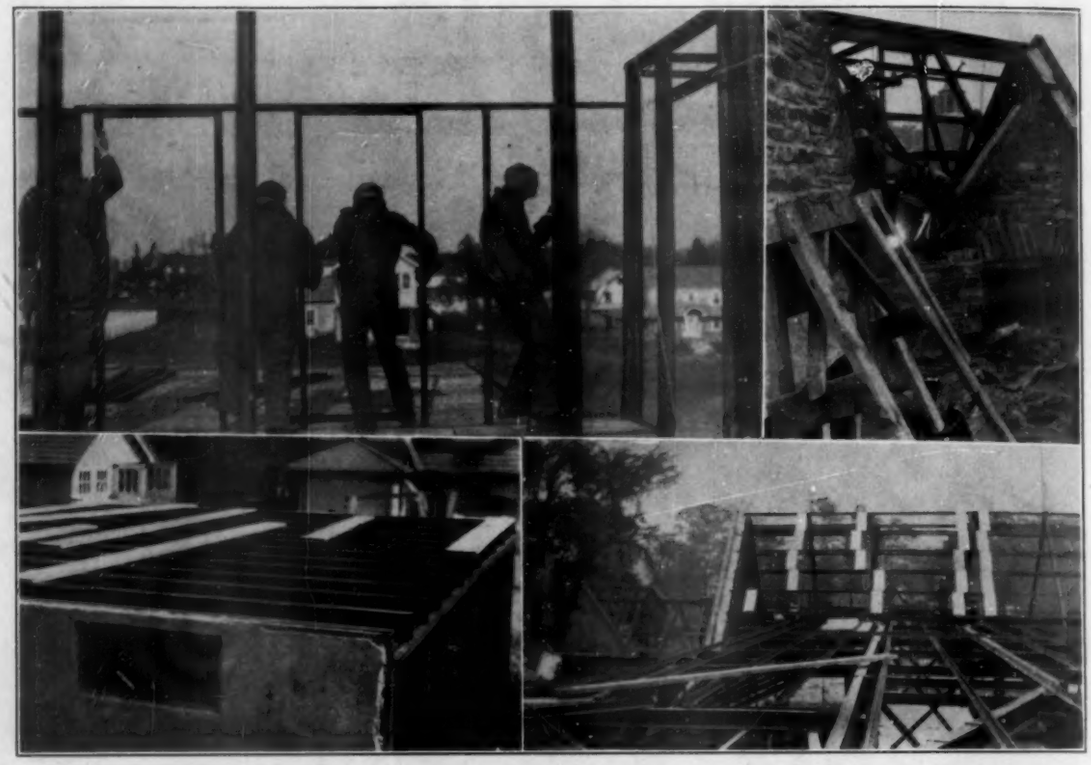

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Building at 152-156 Jelliff Ave., Newark, N. J.
Parkway Baths, Brighton Beach, N. Y.
Holstead Theatre, So. Orange Ave., Newark, N. J.
Prudential Bldg., rebuilt by Foundation Co., Newark, N. J.
Masonic Temple, Broad Street, Elizabeth, N. J.
Theatre, First Ave. and 86th Street, New York City.
New Theatre bet. 53rd and 54th Streets, N. Y. C.
Ridgewood Theatre, Myrtle and Wyckoff Ave., Brooklyn, N. Y.
Westbury Theatre, Westbury, L. I.
Wood Ave. Theatre, Linden, N. J.
Woodbridge Theatre, Woodbridge, N. J.
McCombs Road Theatre, Cor. Tremont Ave., N. Y. C.
Theatre, Canal and Ludlow Streets, N. Y. C.
Highland Theatre, Highland Park, N. J.
Lyndhurst Theatre, Ridge Road, Lyndhurst, N. J.
Theatre, Jerome Ave. and Fordham Road, N. Y. C.
Factory Building, New Lidgerwood Plant, Bayway, N. J.

Electric Arc Cutting & Welding Company,
152-158 Jelliff Ave., Newark, N. J.

Gentlemen:

Please send me further information regarding the Industrial Alternarc and the Dualarc.

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152-158 JELLIFF AVE., NEWARK, N. J.